The Builder.

VOL. LXI. No. 2529. SATURDAY, JULY 25, 1891.

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Revived Ruskin.

SOME little time since we had occasion to notice the republication of Ruskin's "Stones of Venice," in a sumptuous new edition, and to point out the absurdity and ignorance of the views as to Venetian and Renaissance architecture therein laid down, and the entire futility of the work, in spite of passages of great eloquence, as a guide either to the principles of architecture generally or the facts about Venetian architecture in particular. There are few enthusiasts in regard to any branch of art who are not tempted at one period of their lives into the expression of exaggerated and onesided ideas which they are desirous to forget or to modify in their maturer years. Mr. Ruskin is an exception in this respect. There are no wild ideas, no crudenesses of criticism or prejudice, uttered in his earlier years, which he is not ready to proclaim and to re-issue to a new generation as infallible prophetic utterances, regardless of the difference which time and experience have brought about in the judgment of those who might have been carried captive in younger days by his eloquence and his rhetorical flourishes, regardless of movements in public taste and appreciation which have entirely falsified his predictions. We have had the re-issue of the "Stones of Venice," we have now the re-issue of the "Lectures on Architecture and Painting" delivered at Edinburgh in 1853*; lectures which as far as architecture is concerned are a mere string of brilliant fallacies and rhetorical misrepresentations. That such extravagant nonsense should have been uttered as serious teaching on architecture thirty-eight years ago is melancholy enough; that it should be deliberately re-issued now is little short of preposterous. About architecture Mr. Ruskin has learned nothing and forgotten nothing since the delivery of these clap-trap orations. But others have learned a good deal, and perhaps learned among other things to appraise him at his true value as a teacher of architecture.

The main business of these lectures is to teach the superior beauty, truth, morality, and holiness of Gothic architecture, and the vileness, dulness, immorality, and paganism, of everything Greek or based on Greek. At a time when the new fervour for revived Gothic was at its height it was excusable enough, or at least natural enough, that many persons should be carried away by this kind of exaggerated enthusiasm. That the revival of Gothic architecture has proved in the end a failure, that it has failed to satisfy the architectural requirements of modern life, that the whole current of recent artistic thought and sympathy has gone beyond it, is nothing to Mr. Ruskin. He re-iterates his rhetorical fireworks of nearly forty years ago with apparently the idea that the world has stood still in the meantime, that the spectators are still willing to gape at these pyrotechnic displays, that he is still to be accepted as the teacher of the new light in architecture. It was new once, no doubt, and attractive from its novelty and the ingenious verbiage in which it was expressed, but it is to be hoped the present generation know at all events a little more about what architecture means than to accept him as an exponent of it.

The grand fallacy that runs through the whole of these lectures is the constant reference of architecture to examples in nature. Nature, in regard to her physical forms, has nothing whatever to do with architecture, and architecture nothing to do with nature. Architecture is a highly artificial and conventional form of art, the business of which is to impart dignity and expression to structure. For decorative detail forms and suggestions from nature, more or less conventionalised, have been pressed into the service of architecture; but the main forms of architecture arise out of structural and mechanical conditions of an entirely artificial nature. The very first comparison made in the book between the system of construction of Greek and Gothic architecture is an ignorant misrepresentation. The reader is told to believe that beam and lintel construction is not as strong and permanent as arched construction. It is perfectly true that cross-strain is the weakest way in which to use material; but as long as the lintel is strong enough to bear the strain the beam and lintel construction is the most durable of any. The reader is told that however well a building is built on this principle, "it will not stand so long as if it had been better constructed," *i.e.*, with arches. From certain passages in the "Stones of Venice" it appears that Mr. Ruskin does not scientifically know what an arch is or how it acts; at all events it appears that while he is alive to the existence of cross-strain in the beam, he is entirely oblivious of the existence of oblique pressure in the arch, or of the phenomenon, in large arches, of the dropping of keystones from ever so slight a movement of foundation or abutments. He points to the remains of arched buildings, such as the Colosseum, as proofs of the permanent nature of arched buildings; it suits his purpose to forget the far older trabeated remains of Egyptian architecture, and he knew that his audience could not contradict him. As a matter of fact, there can be no doubt that had the Parthenon not suffered from violence and an accident of war, it would now be standing complete; weather-worn no doubt, but as stable as the day it was erected. Lintel construction is limited in its possibilities and wasteful in the way the strain is applied to the lintel; but once constructed of sufficient strength, it is the most stable of all forms of construction,—almost proverbially so.

This misrepresentation in regard to structural matters is trivial and pardonable compared with the portentous nonsense of which the author is guilty when he comes to urge the æsthetic superiority of the pointed arch over every other form of building. The pointed arch, we are told, is the most beautiful way of covering a space, because it is one of the forms "which, as we know by frequent occurrence in the work of Nature around us, has been appointed by the Deity to be an everlasting source of pleasure to the human mind." Just noting the modest manner in which, here as elsewhere, Mr. Ruskin has taken on himself to be the interpreter of the Divine mind, we pass on to read that if we pluck any branch from the trees or flowers "to which the earth owes its principal beauty," we find the ends of the leaves pointed. *Ergo*, arches must be

* Lectures on Architecture and Painting: delivered at Edinburgh in 1853. By John Ruskin, LL.D. With illustrations. New edition. G. Allen; Orpington; 1891.

pointed; and to emphasise the lesson, we have an imaginary drawing of a spray of leaves designed "on Greek principles," with the leaves square and the stalks springing symmetrically at right-angles. People who can swallow (or write) such stuff as this are, it is to be feared, past reasoning with. As a matter of actual fact, every detail of Greek ornament, with the exception of the key pattern (a purely geometrical form) is pointed in form, and is derived in a distant and highly conventionalised manner from natural suggestions; so that the whole statement is a misrepresentation to begin with. Secondly, minor ornamental forms have no analogy with forms depending on structure; and if we reasoned from nature to architecture at all, it might be observed that while leaves are usually pointed (not invariably), trees as a whole are always rounded in their outline, as Mr. Ruskin himself has specially remarked in another work; but one never has to go far to find him contradicting himself. Furthermore, every architectural student nowadays knows that the pointed arch was obviously not adopted from an idea of its beauty at all; obviously, because those who first used it in large arches for structural reasons continued to use the round arch in the merely decorative arcades. The point is really too absurd to discuss seriously; but it is a typical example of the kind of claptrap with which a man who has the gift of rhetorical cleverness can throw dust in the eyes of an audience, and amuse them with imaginary exemplification of principles which have no groundwork except in his own prejudices, or in the desire to say apparently clever and startling things. It is perfectly true, as observed further on, that "a square leaf on any tree would be ugly, being a violation of the laws of growth in trees." But buildings do not grow by the law of growth of trees; they are artificially put together in accordance with statical conditions and for an artificial purpose. Where ornament is used which is based on forms of natural growth, it should follow the principles of natural growth, and in all the best Greek ornament it does so, even more completely and logically than in Gothic ornament for the most part. But a built structure is a different kind of thing entirely from foliated ornament.

The whole book is full of these false analogies, introduced as special pleading and to throw dust in people's eyes. We have a sketch of a piece of Gothic foliage contrasted with a piece of channeled rusticated masonry, and the reader is told it shows the contrast between the beauty of Gothic ornament and the poverty and dulness of Classic ornament. No one ever pretended that rustication was ornament at all; it is a means of giving a certain expression of strength to a wall, and procuring contrast by diversity of surface. All the real beauty of Greek and of much of Renaissance ornament is carefully kept out of sight, ignored, as if it had no existence at all, the author trusting to the ignorance of his readers to take his barefaced misrepresentation as the whole truth on the subject. In the frontispiece to the book we have another example of Mr. Ruskin's perpetual jugglery with the truth. To show the falsity and weakness of conventionalised sculpture as compared with nature, we have a careful drawing of a tiger's head made by an able artist, contrasted with a rough and clumsy drawing of one of the worst examples of a conventional lion's-head spout that could be picked out; and then the reader is solemnly told that nothing has been exaggerated in the contrast. Possibly not; but the lions' heads on the Parthenon are much better than this; only to give one of them would have spoiled the point which it was desired to make. It may be added, of course, that a realistic lion's head would be quite out of place as an ornament which is to form part of the architectural design. It is in this case not sculpture, but architectural ornament, which has to be conventionalised to make it form a part of the architecture. Carve it within a panel, as a piece of sculpture added to the architecture and not a portion of the architectural design, and you may make it as realistic as you please, conformably with the conditions of sculpture, which also do not admit of absolute realism.

In the addenda to the lectures we have some further lights on architecture, conspicuous among which is the monstrous statement, laid down as an incontrovertible axiom, that "Ornamentation is the principal part of architecture: that is to say, that the highest nobility of a building does not consist in its being well built, but in its being nobly sculptured or painted." A man who could say that does not know what architecture means, which is in fact just what has been the matter with Mr. Ruskin all along. Architectural thought, architectural design, begin from the very plan of the building, and are carried out in the manner in which the structure is raised on the plan. But of planning and structure Mr. Ruskin knows nothing, and therefore naturally cannot understand the interest and the expression that lie in them. The idea is contradicted by the fact that many of the finest and most impressive of Mediæval buildings, the early transitional abbey churches, are almost entirely without carved ornament, but their superiority to the productions of the later periods of more florid and ornamented Gothic is incontestable. This would not perhaps have been admitted at the time these lectures were delivered, but most students of Mediæval architecture have come to see it now, and the contrary opinion is hopelessly out of date. The same holds good in other styles of architecture. The Parthenon is grand and impressive in ruins and with its sculpture torn away. The Pantheon is impressive as a grand architectural conception, in spite of, not because of, its bad and coarse detail. The author goes on to support his proposition by some of his usual sophistries. "The greatest architects hitherto known in the world were Pheidias, Giotto, and Michelangelo." Any one who knows anything of architecture and its history will simply meet such a statement with a flat denial. There is no proof that Pheidias was an architect at all, or was concerned with the architectural setting-out of the Parthenon; we do not know positively who the architect of the Parthenon was, but from what we now know of its refinements of design (of which probably Mr. Ruskin is entirely ignorant) we know that, whoever he was, he had enough on his hands without modelling the sculpture as well. It is considered now by the most learned Italian antiquaries that there is no proof that Giotto was architect of the campanile called his, and that probabilities are against it; and it is quite certain that Michelangelo was an architect who very imperfectly understood his business, and made a very coarse affair of St. Peter's, which in better and more refined architectural hands might have been impressive for some other qualities besides mere scale. It is known from recently-published documents that Raphael, one of the greatest painters who ever lived, confessed himself entirely in despair before the problem of continuing St. Peter's, when it was for a time put into his hands. The best part of the argument is that, having been told in the earlier part of the book that Greek architecture was a wretched form of production, false in every way, artistically and morally, we now learn that Pheidias was one of the three greatest architects the world ever saw, because he was architect of the principal Greek temple! For that supposition is the only one on which he is called an architect at all. If he was the architect of the Parthenon (which we doubt), he certainly was one of the world's greatest architects; but the admission entirely nullifies the whole of Mr. Ruskin's own previous assault upon Greek architecture. And as a further example of the author's consistency, after telling us that all architecture is ornament, we are given, in a book called "Studies in Ruskin," recently published,* a view of a water-mill built specially at Mr. Ruskin's instigation, of which we are told that he is "justifiably proud," and which is a parallelogram with an ugly hipped roof and rows of square windows like a Harley-street house. So much for preaching and practice!

Of the book just named it is hardly worth while to say much. It is one of those exaggerated and absurd pieces of Ruskin-worship which weak-minded people seem proud of flourishing about, and which can only excite a smile on the part of those who are too logical and clear-headed to bow down to such a very vain and unsatisfactory idol. It is partly a reprint from an evening paper distinguished for its hysterical enthusiasms. The writer either says, or quotes from some one else (it is not much matter which), that the nineteenth century will be remembered as the century in which Ruskin wrote. It will, perhaps, be remembered as a curious and instructive phenomenon that a writer so illogical, vain, and wrong-headed, should have drawn so many worshippers after him by the mere possession of the gift of eloquent language, and the employment of rhetorical sophistry and exaggeration. The number, however, of these innocent and trusting disciples is, we are inclined to think, every year on the decrease. His public are beginning, in fact, to find him out.

We have confined ourselves to two or three of the main fallacies in these "Lectures on Architecture"; to have followed and exposed all the absurdities and sophisms in the book would have occupied more space than the task was worth. But we cannot resist quoting a specimen of what Mr. Ruskin is capable of when he is at his best. Here is one of the proofs he adduces of the superior attractiveness and beauty of Gothic architecture, as compared with modern Classic buildings:—

"If you really make up a party of pleasure, and get rid of the forms and fashion of public propriety for an hour or two, where do you go for it? Where do you go to eat strawberries and cream? To Roslin Chapel, I believe; not to the portico of the last built Institution. What do you see your children doing, obeying their own natural and true instincts? What are your daughters drawing upon their cardboard screens as soon as they can use a pencil? Not Parthenon fronts, I think, but the ruins of Melrose Abbey, or Linlithgow Palace, or Lochleven Castle, their own pure Scotch hearts leading them straight to the right things, in spite of all they are told to the contrary."

It would be a pity to spoil that by any comment. But enough of such twaddle.

* "Studies in Ruskin: Some Aspects of the Work and Teaching of John Ruskin." By Edward T. Cook, M.A. George Allen, Orpington. 1890.

BUILDING IN THE UNITED STATES.

FROM A CORRESPONDENT.

THERE is, perhaps, no country in the world where a better appreciation of the phrase "Time is money" may be had than in the United States of America. Labour is dear, and the fact makes itself plain on every hand. In every branch of the mechanic arts everything possible is done to reduce labour and get the work done quickly. In the construction of buildings the high cost of labour makes itself very much felt, and produces systems of construction which would appear to English eyes to be far from workmanlike.

Perhaps no branch of building construction stands in greater need of improvement than brickwork. Let some of the practical readers of the *Builder* who are inclined to view with something akin to horror an 18-in. pier built without closers, consider a country where brickwork is constructed almost entirely without bond, where damp-courses and hoop-iron bond are practically unknown, and where the whole of the brickwork of a four-story building is not infrequently erected within the space of a single week. It should be added as an offset to this, however, that the appearance of outside brick walls is, in general, almost all that can be desired, while the large variety in form and colour of the bricks now produced places at the command of the architect and builder means for producing effects which are truly admirable.

In comparing the system of constructing

brickwork in America with that followed in "the Old Country," it may prove useful to refer briefly to some of the more commonly-used bricks, and to give their cost,—for convenience, in its equivalent in English money. What would be termed a "place" brick in London, is called a "pale" in New York, and a "salmon" in Philadelphia,—for names as well as methods of construction vary largely in different parts of the States. Pale and salmon bricks cost 1*l.* per thousand, and being underburnt they are, of course, only used for inferior buildings. The next variety, which may be compared to the English "stock," is known as "hard brick," and is worth 1*l.* 16s. This brick is of a bright red colour in Philadelphia, New York, and the East, and is a light straw-colour in the North-Western section of the country.

Hard brick is used for interior walls and for the backing of all front walls. And we should here explain that excepting in the commonest description of buildings, in barns, stables, &c., all exterior walls are invariably built of two distinct varieties of bricks, the outer casing being termed face-bricks, while the backing is made up of either hard or pale brick.

There is a very large variety of face-bricks on the market, varying in cost from 4*l.* to 25*l.* per thousand. The Philadelphia facing-brick is of a firm, close texture, and pleasing, brilliant red colour, of very nearly uniform size, and with straight edges. These bricks cost on pier 4*l.* 12s. Buff facing bricks cost 7*l.* There has lately been a great demand in city building for what are known as "Pompeiian" bricks or, as builders usually prefer to call them, "Pompeys." These are of a peculiar reddish-brown colour, spotted with black, and when laid they look well. They are made in two sizes, viz., 8 in. by 4 in. by $2\frac{1}{4}$ in. (which is the uniform size of facing-bricks) and 12 in. by 4 in. by $1\frac{1}{2}$ in. Pompeiian bricks cost from 8*l.* to 11*l.* per thousand, the last-named size being the most expensive.

The above figures are given because, for one reason, there is,—strange as it may appear,—no such thing as a builders' price-book published in the United States, and hence the only way of ascertaining prices is to correspond with the manufacturers or dealers. Some enterprising publisher will probably make his appearance one of these days, and give the building community of the States the benefit of a "Laxton."

Coming now to the construction of brick-work proper, bricks are comparatively little used for foundations, chiefly for the reason that suitable building stone is available. For instance, New York city is almost wholly built up, in the foundations of its buildings, of gneiss rock, of which Manhattan Island is largely composed. In erecting foundations of stone, no attempt is made to produce more than a rough rubble wall, or, as it is called, "broken range." The thickness of foundation-walls built in this way is rarely less than 18 in. Damp courses, as before stated, are to all intents and purposes unknown. It is very rarely indeed that bricklayers think of putting in anything to prevent damp rising. The bricks, generally speaking, are not very absorbent, but the walls are, of course, more or less damp. It is probably for this reason that in all first-class structures,—and indeed one might say second-class also,—the plaster is not rendered directly on the walls, but they are "firred out,"—that is, lathed. All laths are at least $1\frac{3}{4}$ in. broad and $\frac{1}{8}$ in. thick.

The foundation walls having been brought up to the level of the street the brickwork is built upon it in a manner which, to say the least, must appear peculiar to an English bricklayer. If the wall is an interior one, the operation is very simple and is carried out with the strictest regard for the saving of time. The bricks are all laid stretchers excepting in every fifth, seventh, or ninth course (depending upon the quality of the work), which are laid headers. English and Flemish bonds are practically unknown in the country excepting, perhaps, as curiosities in old buildings, some of which were erected in Flemish bond. Running bond, with its one course of headers in five, seven, or nine, is almost universally employed. But to state that a wall is nearly all stretchers, tells little as to the manner in which it is actually erected. The English plan of taking each brick separately, and carefully placing it in position, would take far too much time, so the following method is followed:—The bricklayer builds up a half-brick wall to a height of five, seven, or nine courses, as the case may be. Then, on the other side of the wall, he builds up another little half-brick wall, leaving a space between the two casings, according to the thickness of the wall. The bricks of these casings are laid with something like care, although as a rule the mortar is not spread on the bed of the bricks below, but is "wiped off," so to speak, from the trowel to the upper edges of each brick held in the left hand of the bricklayer, who then turns it over and places it in position. Suppose the wall in course of erection to be equal in thickness to two bricks and a half. When the two little walls have been built up, there will be a space between them a brick and a half wide to fill up. The bricklayer takes his trowel,—a very large one,—and with a dexterity and speed almost bewildering to a foreigner, throws in five or six trowelfuls of mortar, pours in a pail of water on top, gives the mortar a stir with the trowel (making it about as thin as grouting), and then with both hands takes up bricks, half bricks, and pieces of bricks, places them in the wall, arranging them as best he can in his hurry, and squeezing up the liquid mortar between them. An occasional half-dozen trowelfuls of mortar, and another half bucketful of water, and the interior of the wall is brought up to the height of the exterior casings. Now is laid a course of headers, then six or eight courses more of stretchers, and so the wall grows.

Now it must not be supposed that the operation of bricklaying, as described, is that carried on only in inferior buildings, on the contrary, it is used in the most important structures. In some parts of the country the grouting process, if it may be so called, as described, is not used, but the bricks of the interior of the wall are laid, each course dry, and mortar of a thin consistency is spread on top and allowed to run into the joints.

But if the construction of interior walls appears to be open to improvement, it is certain that outside walls fall short of good construction in a greater degree. Every face-brick must be laid a stretcher,—that is a *sine qud non* of American brickwork,—no headers are allowed to be seen. Then, how, it may be asked, is bond obtained? Well, such as it is, it is obtained by cutting off the back corners of the face bricks in every seventh course only, and inserting the bricks at the back diagonally, as shown in fig. 1, which represents a plan of

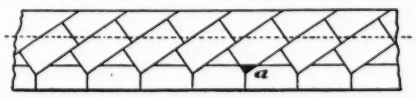


Fig. 1.

one course, the dotted line "*b*" showing 8 in. wall. Thus, it will be seen that the very small triangular piece marked "*a*" in fig. 1 is the only bond between the inner and outer casings. When the facing bricks are only inch and a half deep, bond is obtained by inserting small pieces of hoop-iron *across* the wall. These iron bonds are sometimes inserted also in walls of ordinary-sized bricks, but not often. Hoop-iron bond, as used in England, is not used at all, at least as far as the writer can ascertain by careful inquiries.

Many of the building appliances used in the States are of very ingenious construction. In large building operations lifts or "elevators" are used for raising bricks, mortar, and materials. They are usually formed of a small platform, having in the centre an upright post, around which the hods are stacked. Gangs of hod carriers,—whose wages, by the by, are high, 10s. to 11s. a day being the standard in New York and Philadelphia,—seem possessed of the fever of speed which dominates all the operatives more or less. To a stranger, it must appear that these hod-carriers are a very industrious set of men, for they do not stop work a minute, but run up and down the ladder at a great rate. But there is a little secret attached to their speed, and it is this. Every gang of hod-carriers has a "leader." This leader is picked out for his quickness, and he gets higher wages than the rest. It is his business to get his hod filled, and run up and down the ladder as quickly as possible. Now, all the gang are bound to follow him, and must not drop out of line on penalty of discharge. The quicker the leader works, therefore, the quicker must all the others. Thus, by a practical game of follow-my-leader, is a good deal more work got out of a man in a day than there would otherwise be.

The absence of arches in American brick-work frequently strikes one. Certainly there are some, but very few are used over door and window openings; no relieving arches are used, and the brickwork rests directly on the window-frames. For this reason the window and door-frames are invariably built in the brickwork, and are never put in afterwards as in England. Of course, when an opening is very wide, arches are sometimes used, but more frequently a wood or stone lintel is used.

A word or two on finishing brickwork may be added. It is the custom in many parts of the country to paint newly-erected brickwork in two or three coats, finishing with what is known as "flat brick red." This dries without gloss, and gives an appearance very similar to Philadelphia brick. The paint is put on all over the face of the wall, including joints, and the surface, when finished, is almost a perfectly level one. The mortar joints are then painted on with white paint put on by means of "seamers" and "liners" (see figs. 2 and 3), which are small striping

Fig. 2.—*A Seaming Brush.*

Fig. 3.—*A Brick Liner.*

brushes having hard bristles the width of a mortar joint. The horizontal joints are run in with the seamer held against a straight-edge as a guide, the vertical lines being painted in without a guide. The appearance of a wall finished in this way is very pleasing, the thin painted seams or joints being all exactly uniform in width and distances.

A. S. J.

BUILDING CONSTRUCTION.

THE "Notes on Building Construction," written for students preparing for the examinations of the Science and Art Department, and hitherto generally known amongst architectural students as "Rivingtons' Notes," have met with a well-deserved popularity, which has naturally led to a publication of a new edition*.

In this new edition there are many pieces of additional information added to the chapters of the former work, and besides these we have further chapters on subjects which many have been surprised to see omitted from the former three volumes, dealing with the subjects of excavation, shoring, scaffolding, and foundations. It has been generally understood that a further volume would deal with these subjects, but they certainly seem more in the right place associated with the other subjects of a purely constructional nature. There are also included chapters dealing very briefly

* "Notes on Building Construction." Part II. New edition. London: Longman, Green, & Co. 1891.

with the most important building materials, and also with Stresses in Structures, which will prove useful as an introduction to further studies.

In Chapter I., dealing with more advanced brickwork and masonry, we have additional matter in the description of Mr. White's Hygiene Rock damp-proof material, but it is to be regretted that the subject of damp-roof courses has not been more fully dealt with; for example, the successful use of asphalte damp courses requires a good deal more description than the brief sentence, "a layer of tough asphalte of about ⅛ in. thick is often used." The subject of hollow walls also requires fuller treatment if the student is to be in possession of information which will enable him successfully to carry out their construction practically, especially with respect to the maintenance of the air space in as dry a condition as possible, a matter which the young architect or builder will soon find by experience to be of considerable consequence.

The vagueness of the former edition with respect to the thickness of mortar joints has now been lessened, but it might have been noted that ½ in. mortar-joints have been determined, experimentally, to be stronger than those of either greater or less thickness. A further plate of illustrations of mortar-joints is commendable, as putting the matter clearly before the student. The account of bond in brickwork is practically the same as before, and it is a pity that opportunity is not taken to introduce a description of the varieties of English bond known as Dutch bond and English cross bond, which are of considerable value. The description of brick drains and sewers is still retained, although it is only a very small part of the subject of advanced drain and sewer construction, and would, therefore, better be either expanded or omitted. It is hardly desirable that young students of building construction should know anything of the construction of brick drains unless they know a great deal more about both drains and sewers. The portion of the chapter dealing with chimneys remains as before, and will probably continue as hitherto, a valuable mine from which students at various technical educational institutions will get their answers. Bearing in mind the implicit faith which is accorded by architectural students to "Rivingtons' Notes," the reasons for the particular forms shown in the section of flues should have been explained and discussed.

Chapter II. deals with timber roofs, and follows closely a similar chapter in the former edition; an addition which might with advantage have been made would have been an account of the manner of constructing the hip of a mansard roof. Early writers of this century appear rather to have revelled in the construction of hipped roofs, but it is surprising to find how very little the modern student knows or understands on this point, and it is, therefore, a matter of regret that a standard text-book of such high value as "Notes on Building Construction" should not deal more fully with their construction.

In Chapter III. we meet with roof coverings, and here we find some valuable additions, especially relating to the construction of tiled roofs and of some special forms of patent tiles. The chapter in the former edition on built-up beams, curved ribs, timber and iron girders has been omitted, which is hardly a matter of regret as regards the antiquated methods of the former of these items of construction, whilst some of the points relating to iron girders have been incorporated in the chapter on stresses. The chapter on centres has also been omitted, which is hardly justifiable, as many of the students in the science and art classes are those who have to deal with the practical construction of these matters, and not purely architectural students, who might possibly be induced to "leave it to the builder."

Chapter IV. in the new edition introduces the subject of joinery; the description of mouldings is included as before, and in addition a fresh plate is given showing how elaborate mouldings are built up. Joints, fixing and grounds, architraves, and skirtings follow as before, as also do the matters of door and window linings and shutters, with some slight additions; these were, generally speaking, highly satisfactory and valuable in the former edition, and the author has done well not to make any material alteration. In dealing with the subject of sky-lights and lanterns, the author has wisely laid more stress upon the importance of what are generally euphemistically called "condensation gutters," but are really of more value in carrying off moisture driven through by the weather, as is almost inevitable in the construction of skylights. It is, in fact, probably the wiser plan to admit, as Continental builders do in the construction of casements, that the simplest and most effective method of dealing with weather-driven water is to provide for its reception and subsequent drainage.

Chapter V., on the construction of stairs, is practically the same as in the earlier edition; there is a sentence added with regard to the best material for fireproof stairs being "first, wrought iron; then cast iron," which requires to be read in connexion with what is said in the following chapter on fireproof floors, wherein is rightly pointed out the necessity of all ironwork being protected from fire. The important chapter in the earlier volume on rivetting has been omitted, which is somewhat to be regretted.

Chapter VI., which deals with fireproof floors, contains a large amount of additional information, principally with regard to various methods of constructing fireproof floors which have been recently introduced; the important points, and the various advantages of different systems, are pointed out, while the effect of fire upon various materials, and its bearing upon fireproof construction, are points which we are pleased to see incorporated.

The next chapter, on iron roofs, has also been considerably and usefully enlarged, and now contains as good an account of the construction of iron roofs as can be reasonably expected in a manual of general construction. Particularly valuable are the additional plates of executed roofs, showing various forms suitable to different spans.

The chapter on plasterers' work remains as before, as also does that on painting, paperhanging, and glazing, with the addition of a short description of some of the many patent methods now in use for glazing skylights without putty.

We then come to an entirely new chapter on excavations, shoring, and scaffolding, with an account of the various methods of planking and strutting to foundations. A very short account of shoring is given, which is by no means sufficient to be of much practical value, and in the detail which is given of the head to a raking shore, wedges are shown between the needle and the shore, although this is, nowadays, generally regarded as both unnecessary and unwise. The general construction of scaffolding is fairly explained, and in connexion therewith the various methods of lifting stones and other building material.

Chapter XI. deals with foundations in as satisfactory a manner as can be in a general text-book, including a good account of piling and other methods of dealing with different foundations. Next comes a short description of some leading building materials, extracted from the III. volume for convenience of students. The final chapter is an introduction to the subject of stresses on structures, and is chiefly devoted to an explanation of the meaning of the terms used in dealing with the subject, and the method in which stresses operate on the structures. These are fairly explained, including the matter some students have rather a difficulty in understanding,—the subject of contraflexure in beams. After this explanation of the nature of stresses, we have a short account of the best forms for resisting these stresses, and the manner of calculating the transmission of loads on beams by means of the method of moments. Finally, an appendix gives the examination-papers of the last three years set at the Science and Art Department for the second stage in building construction. The new edition thus fully maintains the high position which the sterling value of the work as a text-book has obtained.

NOTES.

MR. WATERHOUSE addressed a letter to the *Times* of Tuesday explaining his reasons for dissenting from the recommendations of those members of the Westminster Abbey Commission who were in favour of the erection of a south-east chapel. As the matter is of importance, and as Mr. Waterhouse's letter was printed by the *Times* with a good many mistakes,* we reprint it here from his corrections:—

"Sir Henry Layard has stated in his letter to the *Times* of the 16th inst. the reasons which induced him, Sir F. Leighton, and the Dean of Westminster to dissent from the final recommendation of the report, that the proposed mortuary chapel should occupy the site of the old Refectory of the Monastery.

Would you allow me a short space to explain some of the reasons which prevented me, as a member of the Commission, from joining these distinguished authorities in their dissent?

In the first place, though Mr. Pearson, the architect to the Chapter, produced at the close of the meeting of the Commission a very meritorious design for the proposed building on the site south of Henry VII.'s Chapel, it could only be approached from the Abbey by a cloister threading its way, necessarily somewhat awkwardly, through the arches formed by the flying buttresses of the Chapter House, and thus shutting out for ever from view the lower portions of that most beautiful feature of the Abbey group, just when the condemnation, and, as we hope, speedy removal, of the houses which now screen it from Old Palace-yard would restore to public appreciation a piece of splendid architecture, which has for so many generations been too much concealed.

In the second place, and, on the other hand, the way to the Refectory site from the Abbey is already made. It is one of the most noble and most beautiful that can be conceived,—a way hallowed by association with the past,—the west walk of the Cloisters. It has been urged against traversing the Cloisters to gain the Chapel that tradesmen take that way to the residences of the clergy east of the Cloisters. This, it appears to me, could be prevented by requiring tradesmen to take another route. But the argument further loses force when we remember that it is the south walk they frequent, and not the west, which appears to lead only to the nave of the Abbey, and which is the entrance actually used at present for all funerals but Royal ones.

Mr. Pearson's design, alluded to by Sir H. Layard, for covering the Refectory site with a chapel was, again, one of great excellence. It covered an area nearly, if not quite, as large as the unobstructed portion of the nave of the Abbey, and of about the same proportions, and would surely supply the nation's needs for centuries, with the care now exercised to allow none but the greatest finding sepulture or monumental fame within the Abbey precincts.

It is true that monks once dined on the Refectory site; so have people dined, and, possibly in times long passed, even done worse than dine, in the houses which now occupy the south-east site. I do not think, therefore, that in point of association one site has much advantage over the other.

On the Refectory site we should have a beautiful structure which would not alter the present outward appearance of the Abbey nor the ancient plan of the Monastery in the slightest, which we should not see at all (except perhaps its roof over the Cloisters) until we were beneath its vaulting, and which would have a pathway of quite ideal excellence connecting it directly with the Abbey itself.

On the south-east site we should have, if Mr. Pearson's design for that site was adopted, and when it was fully developed, a building we might well be proud of, but which would add a new feature to the exterior of the Abbey, would be a serious competitor with Henry VII.'s Chapel itself, and be approached by a cloister from the necessities of the case somewhat unworthy of it,—a cloister, moreover, which would confuse itself with, and hide the lower portions of, the noble Chapter-house.

Both schemes, it seems to me, have their merits, or the Commissioners would probably have been able to come to a unanimous recommendation. It is to be hoped that this want of unanimity will

* Among the mistakes, the *Times* printed on every occasion "Henry VIII.'s Chapel" for "Henry VII.'s Chapel"!

not prevent one or other of them being speedily adopted.—I am, sir, your obedient servant,

A. WATERHOUSE.

20, New Cavendish-street, Portland-place, W., July 18."

With Mr. Waterhouse's objections to the proposed south-eastern chapel we are entirely in accordance, and there is a great deal in the arguments he advances in favour of the Refectory site. In fact, it is the best thing to do next to the proposal to enlarge the abbey-church itself by a north aisle, which was the project most favoured by Mr. Pearson, and which we are still of opinion is the only means of really preserving the idea of interment and monumental record in the Abbey. The Refectory site, say what you will of it, is still not the Abbey-church; the added north aisle would be. It is evident, however, that the latter will not be allowed to be done (though we can see no good reasons against it), and failing that, the Refectory site would really be more closely connected in association with the ancient building, by the medium of the ancient cloister, than a new chapel approached by a new cloister; and it would in no way interfere with the aspect of the church.

THE case of Smith *v.* Charles Baker & Sons (a case under the Employers' Liability Act, and reported in another column) has had an eventful history. The plaintiff was seriously injured by a stone falling from a crane that was slung over his head while working. The jury found the employers were guilty of negligence, and that the plaintiff was not guilty of contributory negligence. (He admitted that he had got out of the way on former occasions when the crane was about to be jibbed over his head, but said that on the occasion of the accident he was engaged on work which prevented his keeping a look-out). Notice of motion to set aside the judgment was given in the Queen's Bench Division. The Court of Appeal reversed the judgment on the ground that there was no evidence of negligence on the part of the defendants, and that plaintiff had voluntarily undertaken the risk. Plaintiff appealed to the House of Lords, which on Tuesday last again reversed the verdict by a majority of three out of five of the law-lords. The arguments of one of the assenting judges and of the dissenting judges are reported at considerable length in the *Times* Law Report of the 22nd, and are worth the study of persons likely to be involved in such cases. We do not profess to expound law, but our conclusion is that justice is on the side of the final verdict now arrived at. The plaintiff was at the time engaged on a piece of drilling work which required his undivided attention: he could not look out for himself. Lord Bramwell, one of the dissenting judges in the final decision, considered that the evidence that the crane apparatus was of approved kind and such as is ordinarily employed, was sufficient in itself to exonerate the defendants from the charge of negligence. To the non-legal mind it will probably appear that the fact that a stone fell from its sling is in itself evidence of negligence. It is certainly possible to sling stones so that they will not fall, and it was the moral duty of the defendants to do so under the circumstances.

AT the Berlin International Art Exhibition the only large gold medal for architecture has been awarded to Mr. Waterhouse, R.A. Four small gold medals have been awarded to M. Tomischko and M. Schrœder, both of Russia, Herr Hoffacker of Germany, and Herr Wagner of Austria. England has thus carried off the honours.

A CONSIDERABLE alteration is in progress in the inner entrance-hall of the British Museum, next the door leading to the Reading-room. The two well-known Lycian tombs which have stood there for many years have been taken down under Mr. Murray's orders, and are to be re-erected on each side of the stairs leading down into the room where the remains of the Mausoleum are collected. The advantage of this in regard to the tombs is that the most interesting portion of them is the sculpture on the roofs, which has hitherto been very badly seen. In their new position the roofs will be on a level with a spectator standing at the top of the mausoleum-room steps, and can be examined closely, while the architectural framework can be studied from the floor of the room. The inner entrance hall will be much lighter and more open in appearance when these large erections have been removed from it, and the wall space round it will be made use of for the better exhibition of some of the antique busts and other objects which have hitherto been badly placed on upper shelves in the first narrow gallery leading to the main galleries of antique sculpture.

WE drew attention some time ago to the excavations conducted at Athens in consequence of the extension of the Piræus Railway as far as the Homonoia Square. High hopes were entertained of topographical discoveries, and especially it seemed probable that some building mentioned by Pausanias might be brought to light, and so the ever-vexed question of the position of the Athenian agora be set at rest. This last hope has not been as yet fulfilled; no building that Pausanias described has so far been recovered, but the excavators have lighted on the precinct of "Demos and the Charites,"—a sanctuary long well known from inscriptions. If a direct line be drawn in the axis of the Dipylon to the north foot of the "Theseion" hill it will touch on the northern boundary of the precinct. Pausanias must have walked past it, and it is distinctly disappointing that he has left no mention of it, more especially as, from inscriptions, we know it to have been a precinct in which the statues of distinguished persons were set up. Some notice of the various vases, inscriptions, &c., appears in the Δελτίον for May (only just out); but our notice is taken from Dr. Baumeister's account in the *Berliner Philologische Wochenschrift*, July 18.

THE case of Harrison *v.* The Southwark and Vauxhall Water Company should act as a warning against bringing an action for nuisance too readily. The defendant, by certain pumping operations, annoyed the plaintiff, who complained of the noise and vibration caused by the work. On October 20 the rule in the action was issued, and on the 28th the Company substituted other kinds of pumps, so that henceforth the pumping caused him no serious annoyance. This fact alone would have rendered the action abortive. But the Judge also held that the work in question, being only of a temporary character, no action for a nuisance was maintainable in any event. Temporary annoyance is not the basis of such an action, and as an example the Judge cited the case of the demolition of a house by an owner, who thereby causes an annoyance to his neighbours. On the other hand, if the annoyance arises from wantonness or from permanent work, then there is ground for an action. This law is not by any means new, but the case in question simplifies it in a very clear way.

THE report of the director and treasurer of the Michigan Mining School, covering the period 1886-91, gives a fairly good idea of the rapidity with which institutions of this character develop in the United States. The faculty was first organised and instruction commenced September 15, 1886, and during the year twenty-three pupils were enrolled; at the present time there are over sixty students in the school, and this, considering the special nature of the instruction, is a large number. The scope of the curriculum has been extended each year, and now includes courses of lectures upon almost every subject that could possibly be useful to a mining engineer, surveyor, or manager. The location of the school, at Houghton, is an exceptionally good one, the proximity of mines, &c., enabling the professors to instruct in a practical manner. The report says that men are graduated all over the States in courses in mining engineering that have never seen a mine, and they are no more fitted for mining engineers than would be a city boy for a practical farmer when he had been taught agriculture in the midst of a crowded city, and had never been outside it. "Such graduates know as much about mines and real mining as a blind man does about the appearance of the moon; their knowledge is derived from second-hand information only." This is perfectly true, but the director might have been content with these observations, and then let the matter drop; it is very bad taste to exhibit such little respect for older institutions. His remarks throughout savour of a species of arrogance which, unfortunately, is found too often in reports of this nature emanating from the other side of the Atlantic.

BISHOP'S-COURT, Chancery-lane, excepting the two old gabled houses overlooking New-square, has been recently demolished. Next, northwards, stands Chichester-rents. These are named after one of the numerous town mansions or "inns" of the bishops of Chichester. The story of the bishops' settlement in Chancery-lane is too long for rehearsal in this column. We must limit ourselves to saying that in 1226-9 Henry III. granted to Bishop Ralph de Neville, his Chancellor, three gardens, by side of the then "New-street,"—one on the east, two on the west, of Chancery-lane,—then the property of John Herlicum. In the western garden Ralph built for himself the "noble palace," described by Matthew Paris, and died therein on February 1, 1244. There, too, lived and died his successor in the See, Richard de Wyche, the "Saint Richard" to whom they dedicated the original chapel of Lincoln's Inn. In 1338 Edward III. releases to his Lord Chancellor, Bishop Robert de Stratford, the 30s. annual dues which the Bishops of Chichester were wont to pay, "pro domibus suis in suburbio Londini," to the Prior of New Temple. Early in the following century the bishops had inheritance of the Black Friars' original settlement by Holborn, and of the Coneygarth, or Cotterell's garden (Lincoln's Inn garden). In 1492 the bishop lets Lincoln's Inn to Francis Sulliard, fellow, for use by students of law; in 1535 Bishop Robert Sherborne demises to William Sulliard, usher to the King's bed-chamber, a ninety-nine years' lease, at ten marks per annum, of all Lincoln's Inn; in the next year his successor, Bishop Richard Sampson, conveys the property absolutely, together with the way through the Fyckett's-field gate, over against the Rolls, but expressly retained for himself and successors the house and garden appertaining to the see. In 1634 Bishop Richard Mountague complained of an encroachment by the Society upon his ground in Chancery-lane, and, further, laid claim to an inheritance of the whole site of the Inn. He was successfully resisted; the king in council giving judgment for the Society. Passing on to more recent times we find that the property of the bishops is clearly laid out in a plan signed by Sir James Pennethorne, architect, and dated January 25, 1847, prepared for the then Metropolitan Improvements Commissioners. It is planned as including Bishop's-court and Chichester-rents on the western side of Chancery-lane; and, on the eastern side, all the prop-rty lying between White's-alley (now Church-passage) to the north; the Rolls (Record Office), and the London Parcels Delivery Company's premises,* south; with Elim Chapel and St. Dunstan's-in-the-West burial-ground, east. This portion of the estate, all being within the Liberty of the Rolls, comprised St. Thomas's Church (*circa* 1820), now pulled down; Symond's Inn, close to the Rolls Chapel; and Bowling Pin-alley, Bond's-alley, with other low tenements. Elim Chapel, built in

* Since enlarged by Mr. W. S. Witherington, architect. See the *Builder*, March 13, 1886.

1790, is converted into an engineer's workshop; what remains of the burial-ground stands in Bream's-buildings, lately widened and extended by the Ecclesiastical Commissioners as owners, into Fetter-lane, at back of the Greystoke-place Board School. We are credibly informed that Symond's Inn was demolished in 1874, and that it stood at the back, and on part of the site, of No. 22, Chancery-lane, as now rebuilt.

IT is to be regretted that the courtyards on the west side of Lincoln's Inn-fields are not planted with trees. Seats should also be placed in them. They are at present ugly and useless. If utilised in this manner, children, at any rate on summer evenings, might play in them. They are at present open to the main street and used for no purpose whatever. It is a disgraceful thing that the large garden in Lincoln's Inn-fields is not made a public space instead of being left a mere useless garden. But that is all the more of a reason why the courtyards, which in themselves are small open spaces, should be employed for some useful purpose, so as to give health and enjoyment to the poorer inhabitants of a crowded district.

IN reference to Mr. Dunscombe's report on the sanitation of Cape Town, referred to in our last (page 43), we hear that it is most probable the Cape Town authorities will adopt the irrigation scheme on the Cape Flats, in preference to the outfall scheme. They will probably make the best choice in doing so, though the expense will be greater. Since reporting on Cape Town, Mr. Dunscombe has been commissioned to report on drainage schemes for several other municipalities in the Cape peninsula, forming the southern suburbs, and embracing Wynberg, Claremont, Newlands, Rondebosch, Mobray, and Woodstock. Mr. Dunscombe will probably not return to London till September.

A CORRESPONDENT from the country writes to complain of the inattention of architects and builders to the requirements of coal storage. He complains that in many good houses, as well as in smaller ones, the coal-cellar is made only large enough for a few tons of coal, whereby the tenant of the house is prevented from exercising the wise economy of laying in a year's stock of coal at summer prices. This is certainly a point deserving attention. In towns it may be difficult sometimes to secure the space for this, but it should certainly be done where possible.

SOME interesting examples of carving by Donegal peasants have been exhibited at the Donegal Industrial Fund premises in Wigmore-street. These are a number of carvings of owls, in wood, intended as finials to the bay windows of a house called "The Owleries," belonging to the Countess of Aberdeen. Mrs. Ernest Hart, who has been doing so much to develop native Irish industrial talent in the neighbourhood of Gweedore, endeavoured to get some of the native lads taught carpentry and wood-carving. Two of them came to London for instruction, and were trained at the Polytechnic and at Messrs. Howards' workshops, and at Donegal House under Mrs. Hart's direction, and Mr. Conrad Dressler gave them some instruction in modelling in clay. When the order was given for the owl carvings above mentioned, the boys were sent to the Zoological Gardens to study and sketch various specimens of owls, and then an owl was modelled in clay under the direction of Mr. Dressler, and "a live owl was bought and given the lads to watch and live with." The result is the carving of twenty-four owls with a great deal of spirit and variety, showing that there must have been a great deal of native talent in these peasant boys (whose names are John Allcorn and Patrick Culbert), which might never have been known to themselves or others but for Mrs. Hart's efforts to develope it. The only mistake is, in regard to the semi-architectural destination of the owls, that they have been painted in colour in a realistic manner. This unfits them for use as architectural finials, from our point of view. Probably, however, they will give more pleasure to many spectators on this account; and after all, perhaps, the unæsthetic have their rights as well as the æsthetic!

THE vexed question of Mr. Calderon's "St. Elizabeth" was the subject of a debate in the House of Lords on Friday last week, when the Marquis of Salisbury, in a rather amusing speech, declined to interfere in the matter or to take any responsibility for the action of the Chantrey Bequest trustees, or "to lay down any canons as to the course which artists should pursue in regard to the question of clothes or no clothes." He had not himself had time to see the picture, and his only notion of it was from a sketch in *Punch* caricaturing it as Zæo showing her back to members of the County Council. But he congratulated those who objected to the picture that, having been purchased under the Chantrey Bequest, it would go to a gallery where no one would ever see it. If it had been purchased by a private owner, it would have been seen by all his friends, and by the maid-servants. All this may be good fooling, but hardly touches the real point of the question. As to the gallery where the Chantrey purchases are now hung, there may have been no one there the day Lord Salisbury, as he says, visited it, but there are often plenty of visitors there, and the time may come when a special gallery will be found for the Chantrey purchases. Of course there is no possible objection to be made to the figure itself, as a nude figure. The objection is, first (as we said before ever the question was raised) that an artist takes a serious incident in the history of a saintly woman, *not* because of its intrinsic interest or pathos, but because it seems to afford an opportunity of showing his talent in painting the nude; secondly, that the incident seems grotesquely improbable and (if true) little creditable to the modesty or delicacy of the said sainted woman; thirdly, that it is not a good figure in itself and not worth purchasing as a permanent example of English painting; fourthly, that there seems to be a persistent tendency on the part of the Chantrey Trustees (the Royal Academy) to use the fund in purchasing the works of their own members, and we doubt much whether that was Chantrey's intention. We consider the purchase on all these grounds a very ill-judged one, and the objections that have been raised against it by no means without reason.

COMPETITION FOR A PUBLIC LIBRARY FOR THE PARISH OF ST. GEORGE'S, HANOVER-SQUARE.

THE Public Library Commissioners for the parish of St. George's, Hanover-square, under the chairmanship of Mr. Antrobus, evidently consider themselves a most gifted body of men. The difficulties which beset a professional assessor in the preparation of conditions for a competition trouble them no more than the assessment of the merits of the six sets of designs which were submitted in this limited competition, and upon the relative merits of which the Commissioners thought themselves fully competent to decide without any professional assistance. The conditions are compiled, it is understood, from the conditions used in a competition for another building lately erected, and these conditions are very explicit as to the care which is to be bestowed upon the drainage, ventilation, and other technical matters, which are to be submitted to the judgment of the Commissioners, who, since they have undertaken the responsibilities, may be assumed to consider themselves fully able to express an opinion on these matters. The conditions also state that the elevations must receive the approval of the Duke of Westminster, and also that the architect selected must be able to obtain an estimate for his building within the stipulated sum, or the award may be declared void.

The site is a parallelogram in shape, bounded at the ends by Buckingham Palace-road and Eccleston-street, but no rights of light exist over the land on each side.

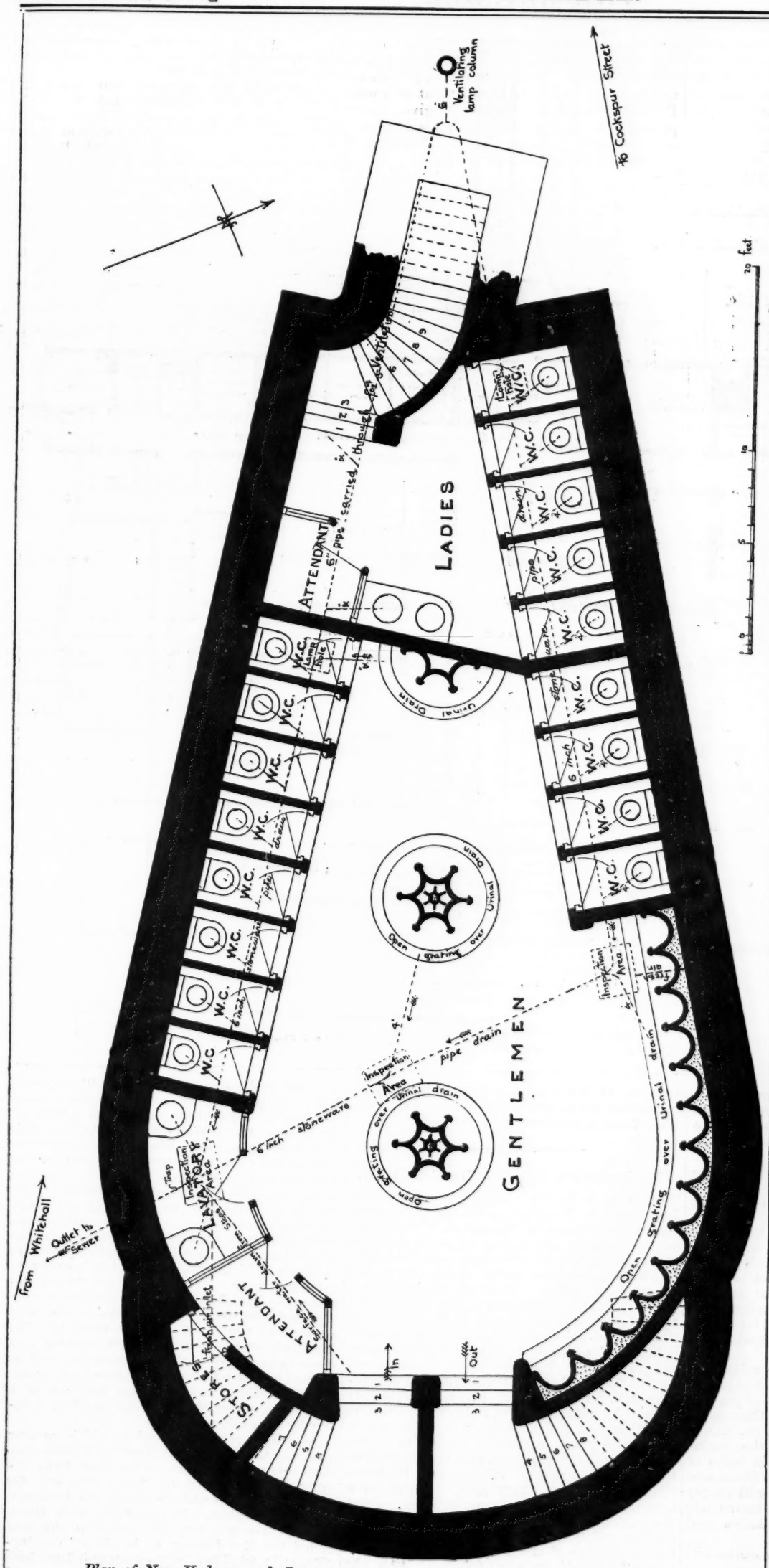
Considering the assessors who made the award it is not surprising that Mr. A. T. Bolton's design, under motto "Utility," should have been placed first, but it is hardly an award that will commend itself to those who have the best interests of architecture at heart.

The other competitors would have deserved much sympathy had they not entered, as there seems every probability they did, into the competition without any guarantee that a professional assessor would be asked to assist the Commissioners in their choice. The following architects took part in the competition:—Mr. E. W. Mountford, Mr. J. M. Brydon, Messrs. Karslake & Mortimer, Mr. A. T. Bolton, Mr. A. J. Hopkins, and Mr. I'Anson.

The ground plan of Mr. A. T. Bolton's design shows in the centre of Buckingham Palace-road frontage the main library entrance, leading to a vestibule, with hall beyond. The ladies' news-room, with lavatory accommodation, is placed on the left, between the main entrance and the librarian's private entrance, which is placed at the west side. On the east side of the main entrance, the news-room is placed, and this top-lighted at the back. The lending and the reference libraries are at the back, facing Eccleston-street, with an early workmen's room placed between; but whether this is meant for a passage way to the library from the porch in the back street or not, is not apparent from the drawings. The librarian's office certainly occupies a central position; but, with this exception, the plan does not seem a particularly good one: the rooms are not a good shape, and the access to the reference library is badly planned. The front part is carried up, and the first floor shows a museum with committee-room, and lavatory accommodation adjacent. The lending library is carried up to the first floor, and the staircase is lighted from a dome overhead. The reference library is also similarly lighted from a dome. The second floor shows librarian's dwelling-house, more or less conveniently arranged, which is reached by a separate staircase from the private entrance already mentioned. The elevations are very severe in their treatment, and might fairly be termed crude. Mr. Bolton differs from most of the other competitors in using the whole of the site and obtaining the necessary light from the roof instead of from areas.

Mr. Mountford has submitted a careful design under motto "St. George" on a red shield. The ground plan has an entrance at the west end of the principal frontage, the rest of the frontage being occupied by the news-room and magazine-room. The vestibule again leads into an inner hall, with staircase lighted by a dome over. From this hall a well-planned access to the lending-library is arranged, which is placed behind the news-room, with a small area on the east boundary, and a glass dome overhead. A staircase in one corner communicates with book stores on the first and second floors of the half of the back portion. The reference library, placed at the back, is entered by a top-lighted corridor from the hall on the west side. On the right side of the corridor a ladies' reading-room and librarian's office are placed, both being top-lighted. A separate entrance and staircase is provided at the east end of the Eccleston-street-frontage, leading to the librarian's entrance, which occupies the first and second floors at this angle. This plan seems a good one, and one that will allow of economical working. The position of the librarian's office might be much improved by placing the long axis of both this and the ladies' reading-room the other way, so as to allow of some supervision to the lending library and the entrance to the news-room; as both these rooms are principally top-lighted this could easily be done. The first-floor plan shows a large museum over the news-room with a north light in the roof. A committee-room, with lavatory accommodation adjacent, is placed over the entrance. The elevations are a pleasant treatment of Late Renaissance, and well adapted for this purpose.

Mr. Brydon's designs were submitted under the motto "Eureka." The plan cannot be considered such a good one as that last mentioned. The placing of the librarian's office on the first floor, where it is certainly near to the committee-rooms, but quite inaccessible to the working departments on the ground floor, cannot be commended. Mr. Brydon has shown areas on each side of the site. The main



Plan of New Underground Conveniences in process of construction at Charing-cros

entrance is placed in the centre, and the librarian's entrance on the left-hand side. The ladies' room is placed between the two entrances and the reference library on the east side. The news-room and the lending library are placed side by side at the back, with their long axes parallel to each other, but at right angles to Eccleston-street. The first floor has a museum in front, with the committee room and librarian's office behind, and a long book-store placed over the lending library. The second floor shows the librarian's residence extending over the museum.

It would be interesting to both the competitors and the public to know the reasons that the Commissioners had for selecting the design "Utility," and rejecting a really able design such as "St. George" on red shield undoubtedly is.

UNDERGROUND CONVENIENCES AT CHARING CROSS.

THE Vestry of St. Martin-in-the-Fields are now very commendably constructing underground conveniences at Charing-cross. The site immediately adjoins that of the statue of King Charles I.

The question of increased accommodation in this respect has for some time past been under the consideration of the Vestry, several sites having been suggested from time to time. The possible sites being ultimately reduced to two, viz., St. Martin's-place and Charing-cross, the Vestry finally decided in favour of the latter.

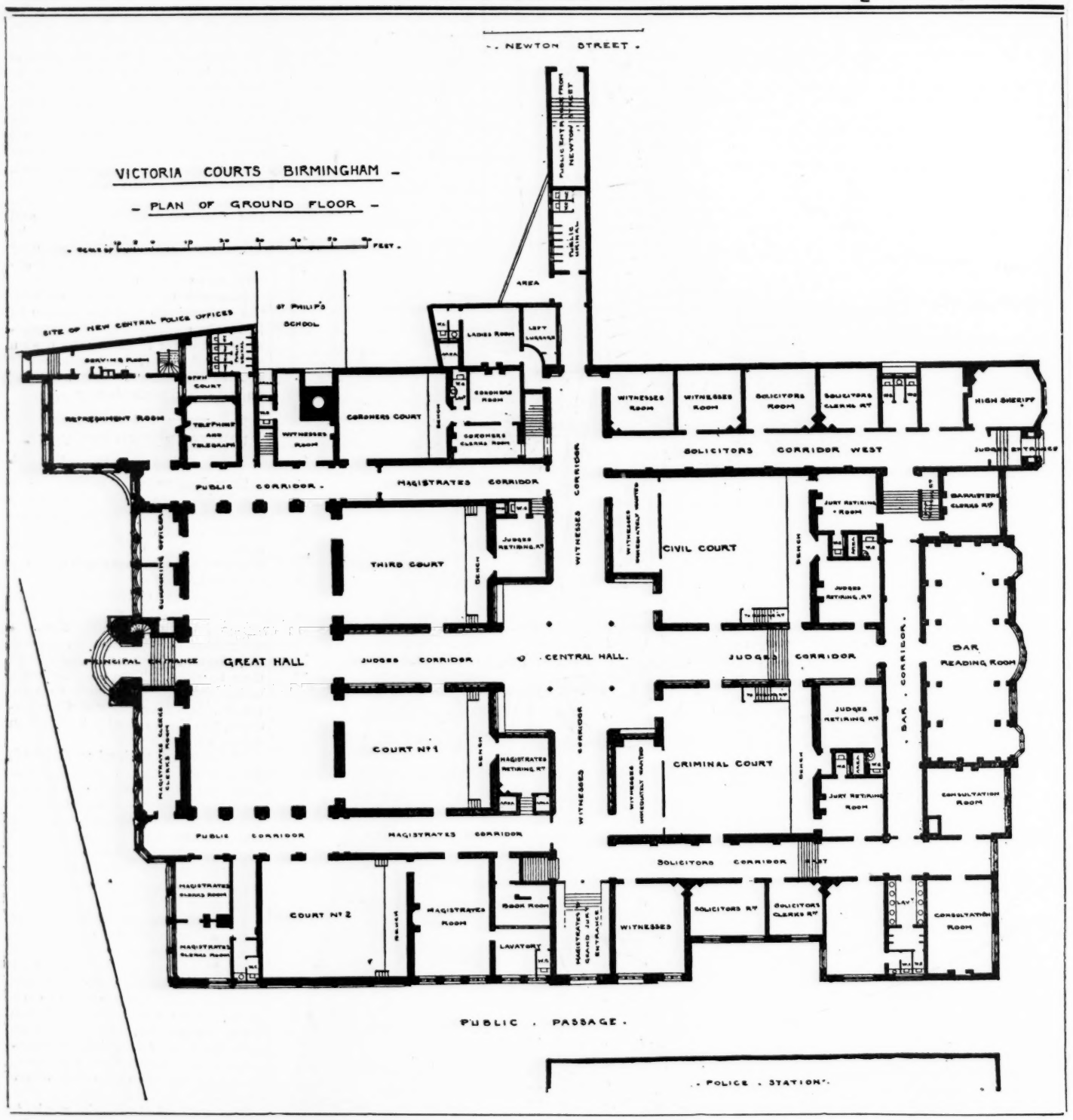
The erection will, when finished, provide (as will be seen by the accompanying plan) the following accommodation:—For men:—28 urinals, 12 water-closets, and 2 lavatory basins; for women:—5 water-closets and 2 lavatory basins. In addition, the usual offices are provided for the caretakers, with store-room adjoining.

The following particulars of the construction may be of interest. The inspection areas, fitted with air-tight covers, are built at every intersection, and lamp-holes are provided to the upper ends of each drain, which are carried through these lamp-holes, and connected with the base of an adjoining lamp-column for ventilation purposes; air inlets are also provided where required.

The general builder's work is being carried out by Messrs. John Allen & Sons, of Kilburn, the ornamental lamp-columns being supplied by the Coalbrookdale Company, and the prismatic lights by Messrs. Hayward Bros. & Eckstein.

The whole of the sanitary fittings are being supplied by Messrs. Doulton & Co., of Lambeth, who obtained the contract for this work, the most improved patterns and latest designs being adopted throughout.

The drainage, which is practically the most important matter as regards the efficient working of the conveniences, has been very carefully considered. A fall of 1 in 30 will be obtained. The whole of the interior faces are to be lined with glazed bricks of an ivory white colour, with special coloured dado, the front walls of the water-closets being finished with a glazed Doulton ware cornice. The woodwork to doors and forming screen walls to the caretakers' rooms and lavatories will be of oak, the floors being paved with Rust's vitrified mosaics. Light is obtained by means of Hayward's prismatic lenses fixed overhead, which, owing to the natural fall of the street above, will be in recesses, lined



with white glazed brickwork. Through ventilation will be secured by means of open grids, the main staircases also serving as inlets; a through current being obtained by air-bricks in the top of the wall dividing the men's and women's departments. An additional means of extraction is provided for in the base of the central gas column, a gas ring-burner being fixed in the base thereof.

The water-closets will be fitted with Doulton's patent "Simplicitas" washdown pedestal closet, flushed by Doulton's patent three-gallon "Paisley" valveless syphon flushing cistern. This form of closet has been decided upon after careful consideration, and it appears to be especially adapted for use in public places, on account of its great cleanliness and perfect flushing.

A special feature is made of the urinals by providing an open semi-circular backed urinal in one piece, of strong white enamelled pottery, with highly-glazed gutter to match, there being no basin or attachment whatever, St. Anne's marble being used for finishing the backs, divisions, and capping. Automatic tanks of St. Anne's marble, with plate-glass fronts and internal fittings of polished copper, will supply the flush to the urinals. Lavatory basins will also be provided both for the ladies and gentlemen.

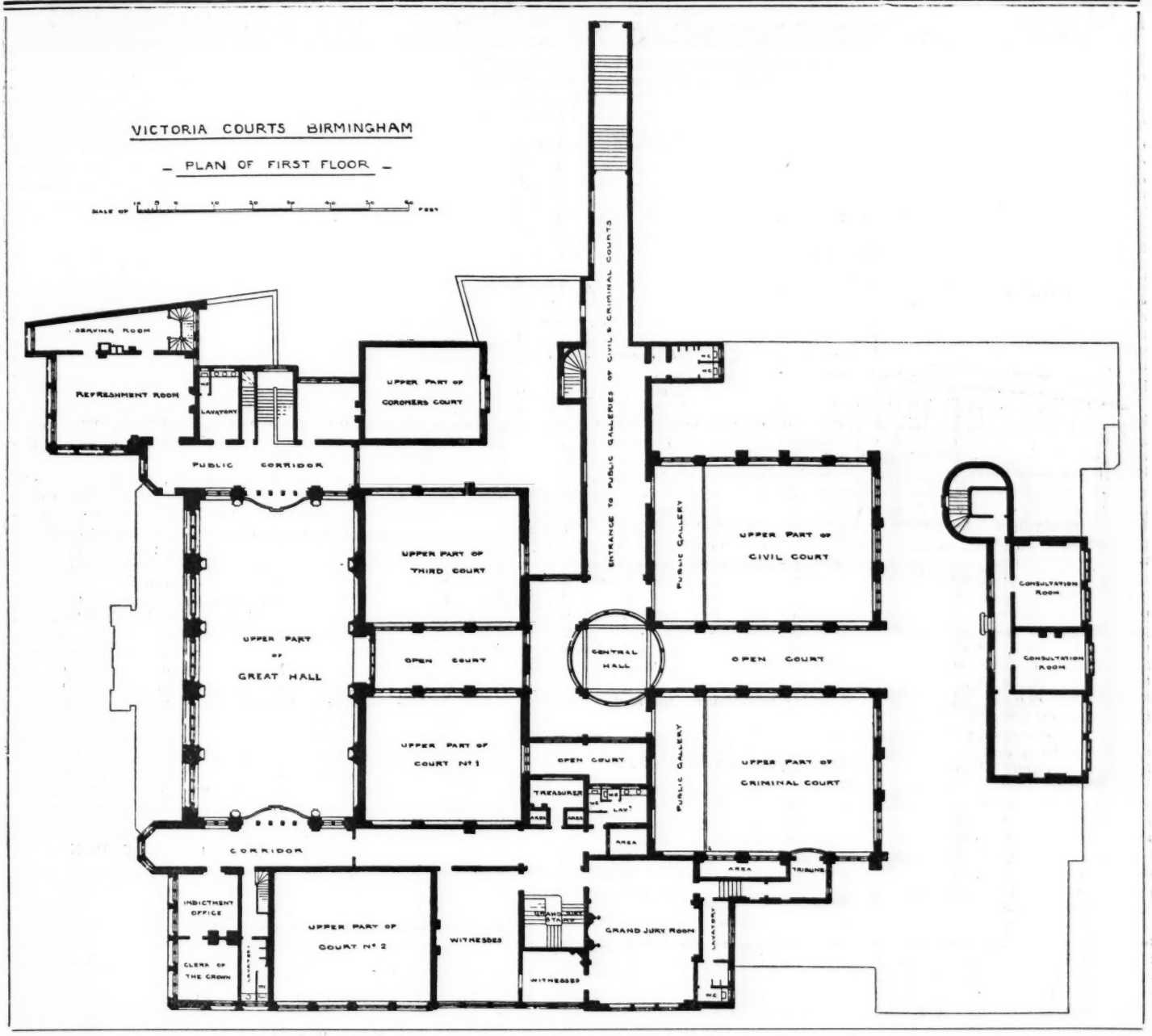
The total cost of the whole of the works will be 4,065*l*.

The entire structure has been designed by Mr. Charles Mason, Assoc. M. Inst. C.E., the Surveyor to the Vestry, under whose supervision the works are being carried out. Mr. Wm. Meats is the clerk of works.

THE VICTORIA COURTS, BIRMINGHAM.

SUCH is to be the official title of the new Law Courts in Birmingham, opened on Tuesday last by the Prince and Princess of Wales. The courts occupy a site having its main frontage to Corporation-street, the important thoroughfare leading from the centre of the city in the direction of Aston. This thoroughfare was driven through what was a few years ago a squalid slum, and forms part of the area dealt with under the Birmingham Improvement Scheme, of which our pages of that date gave full particulars. The courts have been erected by the Corporation of Birmingham in accordance with an undertaking given by that body to provide suitable courts if Birmingham were constituted an assize town. The building was at first intended to contain the assize courts only, but the scheme grew, and it was decided to give up the present Police-courts in Moor-street, and house them also, as well as a Coroner's Court, in the new building. From the commencement Sir Thomas Martineau, a leading solicitor in Birmingham, and a prominent member of the Corporation, actively interested himself in the scheme, with the result that a site in Corporation-street was granted by the Council, and with the advice and assistance of Mr. Alfred Waterhouse, R.A., as professional assessor, plans were obtained in competition, and those submitted by Messrs. Aston Webb and E. Ingress Bell were finally accepted. We gave a perspective view of the selected design in the *Builder* for July 31, 1886, as well as a plan of the principal floor. As, however, that plan has been departed from in some respects, we give two plans of the buildings as carried out. The foundation-stone of the buildings was laid with due ceremony by her Majesty the Queen in her Jubilee year, viz, in March, 1887, and the building has been in progress ever since. While speaking of the foundation-stone (which is a block of granite) it may be mentioned that the architects' names form no part of the inscription cut upon it. The architects may be commended by some for their modesty in this respect; by others they will be blamed for not putting their names upon record, so that visitors and strangers may see at a glance the names of the designers of so noteworthy a building.

As will be seen by the plans which we now give, the accommodation provided includes two large assize courts (those furthest from the great hall), the one on the right-hand for Criminal business and the one on the left-hand for Civil business. In connexion with these, courts, there is a very fine room in the rear called the Bar Library or barristers' reading-room; the windows, with a central bay, look out on to Steelhouse-lane. In the basement of this part of the building, and easily approached



from the Bar corridor, is the Bar robing-room, containing no fewer than eighty lock-up wardrobe cupboards for barristers. On the door of each cupboard is a metal card-frame into which the holder *pro tem.* of the cupboard will place his card. Below this is a convenient hopper-shaped collapsible wirework receptacle for briefs and letters intended for the barrister who is for the time being in possession of the cupboard. Around these two courts are placed consultation-rooms, witnesses' waiting-rooms, solicitors' rooms, and retiring-rooms for the judges and juries.

Nearer the great hall are four other smaller courts. The one on the extreme right will be mostly used for licensing sessions and other business requiring the attendance of a full bench of magistrates, for whom a large retiring-room is provided, so that they may deliberate in private on the applications made to them. The two other courts nearest to the great hall will be used for ordinary police-court business, and one of them will be presided over by the Stipendiary Magistrate. The smallest court, situate to the extreme left on the plan, is the Coroner's-court. Adjoining these courts are waiting-rooms for witnesses, &c., and seats for witnesses and others in waiting are also provided in the space (covered by a domed roof) at the intersection of the witnesses' corridor and the Judges' corridor,—the latter being the name given to the corridor leading out of the great hall opposite the principal entrance.

The principal architectural feature of the building, both externally and internally, is the great hall, 80 ft. by 40 ft. This hall has its longer axis parallel to Corporation-street, with the principal entrance in the centre. The *façade* in Corporation-street, shown in our view on the date named, is executed in red terra-cotta, supplied by Mr. J. C. Edwards, of Ruabon. The style is of a free Renaissance character, some of the detail being reminiscent of late Gothic work. The hall is lighted on each side by a range of five large windows above the level of the entrance porch, the central window being surmounted by a large gable containing in its pediment the Royal arms, and on its apex a figure of Justice, modelled by Mr. W. S. Frith, who also designed and modelled the figures on the summits of the turrets. In the flanking gables are emblematic figures, modelled by Mr. W. Aumonier, representing the arts and crafts in the trades of Birmingham. In the *Builder* for December 21, 1889, we gave a drawing of one of these gables, containing three figures. The great hall is flanked externally by two turrets, one at each end. In the upper parts of these are water-tanks, supplying the fire-hydrants, &c., distributed throughout the building. The richest portion of the *façade* is the central entrance porch, which contains in its gable a statue of her Majesty the Queen, by Mr. Harry Bates. The porch also contains four spandrel figures representing the attributes of Justice, designed by Mr. Walter Crane, and executed by Mr. W. S. Frith. Below the statue of the Queen there is a group of St. George and the Dragon.

In the interior, buff terra-cotta by Messrs. Gibbs & Canning, of Tamworth, has been used for the walls of the great hall and for the walls of the courts above the oak panelling, and for the corridors, chimney-pieces, &c. The whole of the architectural modelling has been admirably done by Mr. Aumonier, from the architect's designs. The effect is very rich, there being a pleasing variety of tint in the terra-cotta. Prominent features in the great hall are the balconies or galleries at the end, and the enriched central doorway (opposite the principal entrance), giving access to the Judges' Corridor. The hall is lighted by a range of five windows on the south side (the side towards Corporation-street), one on the north-side (over the enriched doorway before mentioned), and two large end windows of fifteen lights each. The whole of these have been filled with stained glass as the "Jubilee Memorial" of the city of Birmingham, and have been executed by Messrs, Heaton, Butler, & Bayne, from the designs of Mr. H. Walter Lonsdale, the cartoons being drawn by Mr. Philip H. Newman. Some of the stained glass is very appropriately devoted to representations of Birmingham workmen identified with the special local industries of the city. We give six of these figures on one of our ink-photo plates this week. The roof of the hall is of hammer-beam construction in deal and pitch-pine, left plain from the tool, and has a very rich effect. The height from the floor to plate is 40 ft., and the height to ridge 72 ft. In the *Builder* for January 3 last we gave a view of the central portion of one side of the hall, showing the doorway before mentioned and a portion of the roof. The galleries at each end of the hall are 10 ft. wide, and they, with the spaces under them, form parts of the corridors of the building. Including the width of these galleries and the spaces beneath them, the great hall is 100 ft. long. From the left or west end of the hall, under the gallery on the ground floor, and from the gallery on the first floor, access is gained to two very commodious refreshment-rooms. In the one-story building in front of and entered from the great hall are convenient offices for the magistrates' clerks and clerks' clerks. In the basement are a number of cells for prisoners awaiting summons to the dock; and in connection with this part of the building there is a subway communicating with the detached block of police offices and cells on the opposite side of the paved public passage-way leading from Corporation-street into Steelhouse-lane. The cell-block has separate cell accommodation for upwards of one hundred prisoners arranged on ground floor, first floor, and second

floor, on the covered court-yard system, with a staircase in the centre and a hydraulic lift by Tangye & Co. for the conveyance up or down of recalcitrant prisoners.

Generally, the whole of the work appears to have been admirably planned and executed. The courts and corridors are all well lighted, commodious, and well fitted, the panelling, doors, seats, desks, and other fittings being of oak. The internal wood-carving, of which there is a great deal, has been executed by Mr. H. Martyn, of Cheltenham. The electroliers in the great hall have been executed by Messrs. Starkie Gardner & Co. The gates and the metal fittings throughout the interior, as well as the locks and lock furniture, are Messrs. Hart, Son, & Peard's work, and a point has been made to employ local firms, wherever practicable, throughout, who with the sub-contractors have, we are informed, carried out their respective work to the great satisfaction of the Corporation and architects.

The heating and ventilation of the building has been carried out by Mr. Wilson W. Phipson, M.Inst.C.E., under the direction of the architects, who have devoted much time and forethought in order that all Mr. Phipson's requirements should be embodied in the drawings. By this means, it is believed that a very satisfactory result has been obtained, as in no part of the building, so rich in all its details, can the heating and ventilating arrangements be said not to form part of the structure. To understand the whole of the arrangements, a complete inspection is necessary of the boiler-room, where are fixed the two 50-h.p. Galloway boilers, the pumps, return-water apparatus, and hot-water service heater; the engine-room, in which are placed the two air-compressing engines with the air-cylinder, compressed-air circuits and indicator, and the distributing chamber, from whence the whole of the apparatus of the building is controlled, the heating circuits being divided into seventeen distinct sections. In this chamber are also fixed the pneumatic thermometers, by means of which the engineer in charge can ascertain, at any given moment, the exact temperature of any of the courts. The boilers and compressors are in duplicate, and the system for warming the building is that of low-pressure steam,—the water of condensation being returned to the boilers by an automatic trap. To each court two distinct steam circuits, with regulating valves attached, are taken from the distributing chamber. One of the circuits is for heating the courts by direct radiation, the several steam radiators being evenly distributed, whilst the second circuit is for warming the ventilation air admitted into the courts from the spacious chambers under the same, which are placed in direct communication with the open air. The object of this double heating arrangement is to ensure that the warming of the courts shall in no way interfere with the warming of the air for ventilation, Mr. Phipson contending that by this means, and by no other, can they be maintained at the requisite degree of heat, and so counteract the varying external temperature of our climate. In order to provide for the circulation of air through the courts from the chambers, exit openings are made in the ceilings, which are in communication with up-cast shafts,—every court having its distinct arrangements. In each of these shafts compressed-air nozzles are fixed,—six for the Civil Court and six for the Criminal Court, four each for the Police Courts, and two for the Coroner's Court,—all of which are under the immediate control of the engineer in the engine-room. The air pressure in these nozzles is from 3 lbs. to 4 lbs. on the square inch, and when in full operation a velocity of from 10 ft. to 12 ft. per second is easily maintained in the up-cast shafts. This ensures an extraction per hour from each of the courts of an amount of air equal to five times their cubic capacity. In order to give an idea of the extent of the works above described, it may be mentioned that the direct heating surface fixed throughout the building is equal to 5,000 square feet, and the indirect heating in the chambers under the courts is equal to 2,800 square feet. The area of the supply and return mains may be estimated at 8,000 square feet, and it is calculated that when the whole of this apparatus is at work, including the supply of steam required by the air-compressing engines, it will necessitate the evaporation of 3,360 lbs. of water per hour. For the supply of fresh air to each of the large courts inlet-shafts are provided, having an area of 26 square feet, and for each of the Police Courts an area of 15 square feet. To all of these inlets water-sprays are fixed, in order that the air during the summer months may be thoroughly washed before its introduction to the courts.

It will thus be seen that if the arrangements for warming and ventilating the courts should not give satisfaction to the Judges (who are notoriously difficult to please in such matters) it will not be for want of effort on the part of the architects and engineer.

The building is lighted throughout by electricity.

The general contractor for the works is Mr. John Bowen, of Balsall Heath, Birmingham, his foreman being Mr. Thomas Hall. The furniture has been executed by Messrs. Chamberlain, King, & Jones, from designs supplied by the architects.

Space precludes any attempt at giving the whole of the multifarious details of a building of this magnitude, but we may give a few particulars not hitherto mentioned. Many of the ceilings of rooms in the building are of moulded fibrous plaster, made by Messrs. George Jackson & Sons to the architects' designs. The details of the ceiling of the Judges' corridor was modelled by Mr. W. S. Frith. The doorways to the courts are fitted with Robinson's patent "Sympathetic" door-springs, so that by pushing or pulling one leaf of the door the other leaf opens. The electroliers in the courts are by Hart, Son, Peard, & Co., all from the architects' designs. Gas is laid on to the building, and is used in basement and caretaker's rooms, &c. Messrs. Dent & Hellyer supplied most of the sanitary fittings, and the plumbing was subcontracted for and executed by Mr. Braithwaite, of Leeds. The courts are provided with sunblinds (some of them outside the windows) by Messrs. Hopkins & Son, of Birmingham. Tonks's bookshelf-fittings are used in the Bar library, and many of the stoves, specially designed by the architects, have been manufactured by the Griffin Foundry Company, Birmingham. Many of the windows are fitted with Hope's window-opening and closing fittings. The main roofs are covered with Tilberthwaite (Westmoreland) green slates, supplied by Messrs. James Stephenson & Co. The stairs are of green moor stone. The great hall is paved with 2½-in. York stone laid in patterns, and the Judges' corridor is paved with black and white marble by Mr. Robert Davison, of Marylebone-road, Hayward's patent prismatic pavement lights being used where basements or underground passages have to be lighted. The entrance-gate to the principal porch is of wrought iron from the architects' designs, and bears in its centre the city arms executed in the proper colours in cloisonné enamel work on bronze, with bronze "supporters." This part of the work was executed by Mr. Clement Heaton. A great deal of the flooring is executed on Dennett's system. The clock is by Messrs. Gillett & Johnson, of Croydon, the external skeleton dial having been executed in wrought-iron by Messrs. Starkie Gardner & Co. There is a pleasing variety and a distinguishing character in the treatment of the walls, ceilings, fire-places, windows, and other features of the many rooms in the building. The terra-cotta, inside and out, everywhere shows evidence not only of good modelling but of careful firing, and the result is that distortions of line due to "twisting" in firing are far less conspicuous than might be expected in such a mass of work. Worked in amongst the detail of friezes or string courses in the great hall, and in the courts, are various appropriate mottoes, such as in the great hall, at the east end, the inscription

"Magna Charta. To none shall justice be denied. Ano. Dni. 1215."

At the west end is this line from Chaucer:—

"Truth is the hiest thing that man may kepe,"

and, in another place, the injunction,

"Thou shalt not bear false witness against thy neighbour."

The Japanese lacquer and other papers which are used for the walls of some of the rooms above the panelling were supplied by Mr. L. A. Shuffrey. The roof ventilators over courts were supplied by Mr. John Gibbs, of Liverpool; the lifts throughout by Messrs. Tangye Bros., and the locks, bolts, &c., of cells by Mr. Thomas, of Great Hampton-street, Birmingham.

We understand that the total cost of the building will be about 80,000*l*.

We are glad to hear that throughout the whole of the four years during which the works have been in progress, there has been no fatal accident to any of the men engaged thereon, though, unfortunately, two clerks of works, Mr. Clapp and Mr. Richards, have died. Their courteous successor, Mr. E. W. Nightingale, has seen the building brought to a satisfactory completion, and it is to him that we are indebted for a great deal of the information brought together in this article.

Illustrations.

WINDOWS IN GREAT HALL, BIRMINGHAM LAW COURTS.

THE six illustrations here given form a portion of the series of stained-glass windows in the Great Hall of the Victoria Law Courts at Birmingham, which, as mentioned elsewhere, were opened this week by the Prince and Princess of Wales. We gave a view of the interior of the Hall in the *Builder* for January 3 of this year.

The series, as will be seen, represents types of Birmingham artisans. The decoration round one of them being repeated, with the same character of detail in all, it was thought sufficient to show it one instance only; to have given all the borders would have necessitated much reducing the size of the figures.

The first idea and rough sketch for the work was due to Mr. H. W. Lonsdale, who also made a detail drawing for the decorative border. The figures were all designed and drawn in cartoon by Mr. P. H. Newman, partly by the aid of photographs of men engaged in the various trades, specially taken for the purpose. The work is a good example of the treatment of modern subjects in stained glass, and the decorative border brings the figures into connexion with the architecture, and imparts the rich character of surface which is requisite for the true effect of stained glass.

CHRIST CHURCH PRIORY, HANTS.

CHRIST CHURCH PRIORY is a building dating back to Saxon times, though none of the original building remains, unless it be part of the crypts under the transepts.

The nave and triforium were built *c.* 1090 A.D. by Ralph Flambard, afterwards Bishop of Durham. It is massive in character. The clearstory was added a century after, and is of Early English work. The vaulting of the nave is only of lath and plaster, and is covered with an open-timber fifteenth-century roof above, and roofed with stone slabs. The only part visible is that over the intersection of the nave and transepts.

The north nave aisle is Norman work, but is encased in Early English masonry, and windows of the same date. It is supposed that it possesses some of the original Norman arcading underneath, similar to what is seen round the north transept, with its beautiful Norman turret at the north-east angle. The south nave aisle retains its original Norman masonry, with good arcading under the windows, which were mostly added in Early English times. This aisle retains the ancient canons' door, and the staircase (now blocked up) to the dormitories. Both aisles retain their original vaulting.

The eastern side of the north transept possesses two late Early English chapels, which are well worth studying, as they are of considerable richness. They replaced the original Norman apsidal chapel, similar to the one in the south transept. The curious broken ribbed vaulting and the Apostles' Column are worth noting. The north transept possesses a crypt of Early Norman work, with an apsidal east end and also a tracing loft over the chapels, where it is of interest to find on one of the walls the tracery, drawn out and punctured on the plaster, of a Decorated window, evidently just as it was drawn. The south transept has a groined Norman apsidal eastern chapel, with refined details, and a three-light Early English window, replacing one of the Norman ones. A staircase in the south-east angle leads down to the crypt, also apsidal, and also upwards to the triforium. At Romsey, some twenty-five miles distant, may be found a similar eastern apsidal transept chapel of the same date.

The north porch is late Early English work of elaborate character; the inner entrance is a double archway with a carved and sculptured aureole in the tympanum, the sides also have

arcading with Purbeck marble shafts throughout; it also possesses a parvise, at present unused.

In the south choir aisle also is an Early English chapel.

The choir with its lady chapel was begun about 1400 A.D., though the vaulting was not finished till a century later. It has four large windows, with remains of the old stained glass in the tracery; it is covered with stellar vaulting, brought down to stone pendants, and supported by flying buttresses. Over the lady chapel and ambulatory is another chapel called St. Michael's Loft, which was probably used for festivals for the exhibition of relics, with ascending and descending octagonal staircases used on these occasions. The choir aisles are also covered with lierne vaulting of a peculiar character. A crypt is under the choir, now belonging to the Earl of Malmsbury. In the lady chapel is a reredos, mostly destroyed, with some rich tabernacle work, and probably originally covered with small statues.

The fine Jesse reredos in the choir (date Edward III.) is of unusual size and richness, and represents the figure of Jesse recumbent, with the stem showing his descendants in some thirty-six statuettes. The choir stalls are late sixteenth century, but two miserere seats are Early English work, one being particularly beautiful. The "Rood" screen is Decorated work and elaborate, and is a marked feature in the church.

The tower was built in the fifteenth century, and is dignified and simple, and similar in character to those found in Somersetshire. There are several chapels of various dates; the Salisbury and Draper chapels are strongly Renaissance in feeling. The former is supposed to be by Torregiano. The church is worth careful study, and possesses typical work of many periods from Early Norman to late Perpendicular.

The measured drawings here published are by Mr. C. Bernard Hutchinson, and received an honourable mention in the competition for the Institute silver medal, for which they were submitted.

ST. PETER'S CHURCH, BUSHEY HEATH, HERTS.

THE new chancel, of which the interior view is published to-day, is the first portion of a new church to be built on the site of an inconvenient brick structure, which was erected in 1837. The new chancel has been built at a total cost of 2,000*l.*, including the reredos, altar, choir and priests' stalls, and organ-case. The external walls are faced with Kentish rag worked in irregular courses of from 4 in. to 6 in. deep. Monk's Park stone is used for the dressings of both the external and internal work. The roof is double boarded, felted, and covered with red Broseley tiles. The whole of the sanctuary floor is paved with Derbyshire fossil polished marble, of various tints. The steps, credence, piscina, and re-table, are also of the same marble. The flooring of the choir is of plain 4-in. red tiles, with borders of the birdseye marble. The stalls, altar, organ-case are of oak. The reredos is of Corsham stone, elaborately carved in the style of the Percy shrine at Beverley. The panels of the reredos are filled with paintings by Mr. Beckham, of the firm of Bell & Beckham, of London. The arcading from the east wall of the old church has been refixed on the north and south sides of the new chancel. This wall arcading and the east window were the only things from the brick church worth retaining. The east window was of three single lancets. These have been re-used on the south side of chancel and organ-chamber. New cusping was inserted to make the windows in character with the rest of the new work.

The chancel has been erected from the designs and under the personal superintendence of Mr. James Neale, F.S.A., of Bloomsbury-square, London.

Messrs. Norris & Sons, of Sunningdale, were the builders, and Mr. Stubberfield acted as general foreman. A word of praise is due to the builders and to the foreman for the very satisfactory way they have carried out the building. J. N.

RUSSIAN HOUSES FOR FINLAND.—According to the *Graschdanin*, the new law permitting Russians to acquire property in Finland is causing a considerable export to the latter country of wooden buildings in Russian style.

LEICESTER BOROUGH EXTENSION.

THE Corporation of Leicester have succeeded in obtaining an Act of Parliament for very extensive additions to their Borough.

In the Session of 1886 a Bill was before Parliament, based upon a scheme prepared by the late Chief Engineer to the London County Council, Mr. Joseph Gordon, C.E. (when he was the Borough Surveyor of Leicester), for including an area of about 5,300 acres, and a population of about 18,300, which met with great opposition, and resulted in the decision that the preamble was not proved.

The recent Bill, which has now received the Royal Assent, includes an additional area of 5,500 acres, with a population of 33,000, making the total area of the borough 8,530 acres, and the population 175,000.

The added areas consist of the Belgrave Local Board District, the whole of the parishes of Newfound Pool and Freak's Ground, and the suburban parts of Humberstone, Evington, Knighton, Aylestone, Braunstone, and Leicester Abbey.

Mr. E. G. Mawbey, C.E., the present Borough Surveyor of Leicester, is the engineer for this scheme, and he gave evidence in support.

The Bill was before a Select Committee of the House of Commons, the Right Hon. James Lowther in the chair, and it occupied nine days.

Both the promoters and opponents were very ably represented by a strong body of eminent counsel, civil engineers, analysts, estate agents, chairmen and members of the local authorities, and other gentlemen.

The counsel for the promoters were Mr. Pember, Q.C., Mr. Bidder, Q.C., Mr. Cripps, Q.C., and Mr. Toller, ably instructed by Mr. John Storey, the Town Clerk of Leicester.

Mr. Alderman Thomas Wright, J.P. (who was one of the chief witnesses), is the Chairman, and Mr. Alderman Edward Wood, J.P., the Vice-Chairman of the Parliamentary Committee of the Leicester Corporation, and to these two gentlemen much credit is due for the most indefatigable and eminent services they have rendered.

The Bill was vigorously opposed by the Leicestershire County Council, the Highway Board, the Belgrave Local Board, the Blaby Board of Guardians and Rural Sanitary Authority, the Barrow-upon-Soar Board of Guardians, and by private interests.

The opposition by the County Council and other rural authorities, although various, was chiefly on two questions,—one, the loss of rateable value, on the ground that their incomes from the parishes proposed to be annexed were so much greater than their expenditure in the same parishes, or in other words, that they were to be robbed of their milch cows; and the County Council claimed about £3,000 a year.

The Committee did not, however, acknowledge or allow this principle, and it was argued that there was no precedent for it.

The other question so strongly fought was the alleged unsuitability of the strong clayey soil and steep slopes of the sewage farm, which the Corporation had acquired two or three years ago, it being urged that it was practically impossible to satisfactorily purify the sewage of Leicester by application to such land, and that, therefore, an additional population would only increase the difficulty.

It was, however, proved in the evidence that, notwithstanding the very unfavourable nature of the soil, a very large proportion of the 1,375 acres of land, had during the previous six months been prepared and sewaged by a method so peculiarly suited to the land as to have given excellent results in purification.

The Corporation undertook to efficiently deal with all the sewage within six months of the passing of the Act, to dredge the river Soar (into which the sewage effluent from the old works had been previously discharged) within twelve months, and also, at a cost of 71,000*l.* (for works), to carry out within two years the storm outfall drainage scheme which had been prepared and adopted a few months previously.

On these conditions, the Committee decided that the preamble was proved for the whole additional area, viz., 7,000 acres.

The County Council subsequently agreed not to oppose in the House of Lords on the Corporation agreeing to give about 1,500 acres of the agricultural area on the fringes of the extended boundaries, and to some other conditions of less importance.

The other authorities agreed to very reasonable terms in some small matters of detail.

The new Act comes into operation on October 31 next.

The opponents of the Bill strongly expressed the opinion that the Corporation should have applied to the Local Government Board for a Provisional Order, according to the powers granted by the 1888 Act, instead of going direct to Parliament, and for nearly two days the Bill seemed in danger on these grounds; but the Corporation required that the extension should apply to Poor-law administration, registration of births and deaths, and other matters of Local Government, as well as for sanitary and municipal purposes, and that there should be no differential rating, and it was considered doubtful whether such full powers would be obtained through the Local Government Board.

The report of the Local Government Board on the Bill turned out to be in opposition to the alteration of parochial areas, and to other provisions also. All the powers sought have, however, now been obtained, and the course adopted fully justified.

THE ARCHITECTURAL ASSOCIATION:

VISIT TO HAILEYBURY COLLEGE.

ON Saturday, the 11th inst, a somewhat small party of members of the Association, under the guidance of Mr. F. M. Elgood, visited the school at Haileybury, where, although there was not very much of architectural interest to be seen, a pleasant afternoon was spent amongst the picturesque scenery of this part of Hertfordshire. A short walk through the fields from St. Margaret's Station brought the visitors to the school grounds, and under the direction of the clerk of works, an inspection was first made of the old buildings formerly used as the Preparatory College of the Honourable East India Company, for whom they were designed by William Wilkins, jun., A.M., at the beginning of the present century. These are designed in the correctly Classical Greek style, of which, as our readers are aware, that architect was one of the exponents, and the principal façade possesses considerable dignity as well as correctness of detail, although we may in the present day be inclined to consider that the style adopted is not the most suitable that might be chosen. The merits of Wilkins' work have not been increased by the later blocking up of his open porticos in order to obtain increased accommodation. After visiting some of the dormitories, which are all well arranged on the cubical system, the visitors proceeded to inspect the chapel erected about thirteen years ago from the designs of Sir Arthur Blomfield. This, with its large octagonal dome, in no way harmonises with Wilkins' work, and externally appears to lack both dignity, refinement, and proportion; it also has a somewhat crushing effect upon the earlier work. Internally the design is very much more pleasing, an effect which is largely aided by the colour decoration carried out by Messrs. Campbell, Smith, & Co., the most prominent features of which are the paintings on canvas applied to the walls of the octagonal apse. The form of the octagonal dome has an unfortunate practical effect, besides the æsthetic deficiencies already noticed externally, in that a most troublesome echo exists which has baffled all attempts at remedy; nor can such a form be regarded as particularly suitable for a college chapel, in which the seats are arranged choir-wise as usual.

After leaving the chapel, the visitors next proceeded to the library, which is now accommodated in what was formerly the old chapel of Wilkins' building. Here there is little of architectural interest, the apartment being simply a plain rectangular room, with a Greek cornice; there are, however, some good rubbings of very excellent brasses from various English examples, which are about the most interesting features in the interior of the library. The dining-hall is another plain and cold interior, the effect of which is still further marred by a huge gallery that has been constructed over a large portion of the hall in order to provide additional dining accommodation. The visitors were interested in noting amongst the names of the football team of 1875 displayed upon the wall the name of Mr. Reginald T. Blomfield, whose work at Haileybury they proceeded to visit after an inspection of the kitchen accommodation.

Mr. Blomfield's work is exhibited in what is known as the Bradby Memorial Building, which comprises a fine lecture-room, with a chemical

laboratory on the first-floor, and class-rooms below, while in the rear is an excellently-fitted and lofty gymnasium. As might be expected, the visitors found Mr. Blomfield's work full of charm from the exceeding care devoted by the designer to all the details of the building, the lecture hall, in particular, producing a most pleasing interior, chiefly executed in Stettin and wainscot oak. Besides this building Mr. Blomfield has also carried out the cricket pavilion, on which, as an old member of the eleven, he has naturally exerted his skill to the utmost, and produced a very charming little building, which, with its brown tile roof, bright red tile sides, and white woodwork, is an excellent example of an artistic treatment of such a structure.

After tea in the hall some of the visitors indulged in a swim in the open-air swimming baths, and a pleasant walk back to Hertford completed a very enjoyable outing.

THE GOLDSMITHS' COMPANY'S TECHNICAL AND RECREATIVE INSTITUTE, NEW CROSS, S.E.

The following is a general description of these buildings, which were opened by the Prince and Princess of Wales on Wednesday last:—

The site of this Institute comprises the buildings and land recently occupied as the well-known "Royal Naval School," the foundation-stone of which was laid by the late Prince Consort on "The Glorious First of June," 1843.

On the removal of the school to country quarters, the Goldsmiths' Company purchased the buildings and about seven acres of land, and, with considerable re-arrangements and additions, have adapted them to the present purpose.

The old buildings formed the four sides of a quadrangle or open space of nearly 100 ft. square, and, with their numerous class-rooms, large dormitories, and general school-room, lent themselves better than could have been expected to the change of circumstances, though, no doubt, many of the details would have been more conveniently arranged in an entirely new building.

The front of the main building is retired on rising ground from the Lewisham High-road, giving space for a garden, with carriage approach to the main entrance and footways to the separate departments for men and women.

In general terms it may be said that the men's class-rooms, the workshops, &c., occupy the right or northern wing, and the women's department the left or southern.

On the ground and mezzanine floors of the main front are the rooms of the resident secretary, Mr. J. S. Redmayne, the administrative offices and bookstall at which students can purchase their class-books and other requisites at moderate prices. The first or principal floor is devoted to library, and reading and news-rooms, 100 ft. by 28 ft., approached by separate staircases from the men's and women's departments. Additional book-stores are arranged in the mezzanine below, communicating direct with the library.

The northern wing is occupied on the ground-floor by the refreshment-room, 90 ft. by 24 ft., served by new and carefully-arranged kitchens, with their necessary adjuncts. Beyond this and in proximity to the gymnasium and workshops are the men's lavatories, with hot and cold water, locker-rooms, men's club-rooms, &c. In the mezzanine over these are the clay modelling-rooms and other smaller rooms for the use of some of the masters and for chess and other games. On the lofty first floor is men's social-room, 50 ft. by 35 ft., and approached by separate staircases, the art class-rooms having a total extent of about 200 ft. by 35 ft., divided into elementary and advanced drawing, life study, dressing-rooms for the models, lavatories, cloak-rooms, &c.

Approached from the ground-floor of this wing are the engineers' workshops, 70 ft. by 30 ft., and large electrical laboratory, all fitted with the best appliances. Adjoining the engineers' shops is the engine which drives the whole of the machinery and the pumps drawing water from a deep well sunk into the chalk for the general supply of the establishment and for filling the swimming-bath. Here are also the boilers which supply steam for the engine, for the general warming of the buildings, and for heating the water of the swimming-bath. In a block near to the engineers' shops, and having its machinery connected with the main driving shaft, is the carpenters' shop, with large class or lecture-room over, with several smaller rooms destined for type-writing, commercial classes, and such of the less important branches of trade as it may be found necessary to accommodate.

The south wing, or women's side, contains, on the ground-floor, class-rooms for needlework, cookery, and general instruction, women's lavatories, cloak-rooms, &c., also a large class-room, approached from both sides, and to be used chiefly for physical research or other special scientific demonstration.

In the mezzanine are several private rooms and rooms for games, for small classes, or meetings.

On the first floor is the women's social room, 40 ft. by 35 ft., the chemical department, about 150 ft. by 35 ft., approached by staircases from both sides and divided into elementary and advanced class-rooms, each fitted as a complete laboratory, with benches, sinks, fume closets, and all experimental appliances. Adjoining is the balance-room, chemical lecture-room for seventy or eighty students, demonstrators' preparation room, &c. Above this are the photography studio, dark rooms, &c.

In connexion with the Technical Department must also be mentioned the old School Chapel, capable of seating some 500 people. It is detached from the other buildings, and can be also approached from the public road should it be found desirable at any time to admit other than members. It has been deconsecrated by special Act of Parliament, an additional room has been added, and it is intended to be used as a general lecture-hall, and for lantern exhibitions or for large musical classes, as occasion may arise.

In the recreative department, the feature which first attracts notice is the large concert-hall which occupies the site of the central quadrangle before mentioned. It is 98 ft. by 88 ft., and is approached directly from the lobby in connexion with the principal entrance. As it was necessary to preserve the light and air for the upper story of the buildings round the quadrangle, and the existing walls were not of sufficient strength to carry a roof of so great a span, a special and somewhat novel method of construction has been adopted. Curved lattice ribs of great length, bolted down to special foundations, spring direct from the floor level in the four corners of the hall. Uniting at the apex, about 40 ft. in height, these form two diagonal arches of 125 ft. span, leaving the whole surface of the floor free and uninterrupted by columns or other supports. Lattice-girders or purlins, of 68 ft. span, 25 ft. from the floor, with others of less dimensions, carry the rafters and covering of the roof. The hall is well lighted from the roof at the junction of the main ribs and by a series of skylights at a lower level. The platform and galleries for chorus are on the western side of the hall, and a fine organ is in course of construction by Messrs. Abbott & Smith, of Leeds, at a cost of some 2,000*l*. The floor of the hall will seat about 1,300 people according to County Council requirements, besides performers and chorus of about 100 persons. On the mezzanine level are galleries to hold 200 to 250, with independent staircases. Care has been taken to provide sufficient exit in case of panic among the audience. There is a spacious corridor on all sides of the hall, and besides the main entrance doors on the western side, which are 10 ft. in width, there are two of 7 ft. in each of the other sides, with corresponding doors in the outside walls of the building, giving on to the open ground. The galleries are approached by similar corridors on the mezzanine floor, and special external escape stairs lead from each to the grounds outside the building.

Immediately at the back of the great hall is the gymnasium, about 100 ft. by 38 ft., which has been adapted and enlarged from the old Royal Naval School Room. On one side of this is a gallery from which spectators can watch the special gymnastic displays which will take place from time to time. Here also will be fixed the motors for supplying air to the organ.

To the north-west of the principal buildings, and connected therewith by corridors, is the new swimming-bath, 90 ft. by 50 ft., the pond itself being 80 ft. by 30, with a capacity of about 80,000 gallons. The bath is supplied from the well, the West Kent Water Company's mains being also connected for use in case of need. From the well the water passes through a heater, and is discharged into the bath as a cascade. By means of a centrifugal pump a continuous circulation is kept up, water being abstracted from the bath, passed through the heater, and returned by the cascade at the rate of some 6,000 or 7,000 gallons per hour, with any fresh water required to make up for loss while the bath is in use. A uniform temperature of about 72 deg. is thus retained. On each side are a number of dressing boxes over which are galleries for spectators. There is a separate entrance to this bath from the public road, so that it may be available by arrangement for schools, outside clubs, or such of the public as may be admitted on specified conditions.

The old school swimming-bath (much too small for present requirements) still exists, and will probably be made available for private hot and cold baths, should there be a demand for them.

Extending along the back of the building is a large paved court of about 2,000 square yards, which will be available for various games, drill, and general exercise in the winter. Beyond this is the recreation-ground, about 4½ acres in extent. At considerable cost this has been levelled and a good running track laid out, of about four laps to the mile. Inside the track is space for cricket, tennis, or foot-ball.

With such experienced practical men as Sir Frederick A. Abel, K.C.B., F.R.S., chairman, Sir Frederick J. Bramwell, Bart., F.R.S., Dr. W. Anderson, F.R.S., Director General of Ordnance Factories, Mr. Charles Lucas, and others on the Building Committee, it may be safely assumed that the 70,000*l*., or thereabouts, the Goldsmiths' Company are stated to have expended on the Institute and its appliances has been laid out to the best advantage.

It is clear, at any rate, that the chemical and electrical departments, the constructive ironwork and the engineering appliances generally, must have received special attention.

The whole of the works have been carried out from the designs and under the superintendence of Mr. J. Wornham Penfold, F.R.I.B.A., Surveyor to the Goldsmiths' Company.

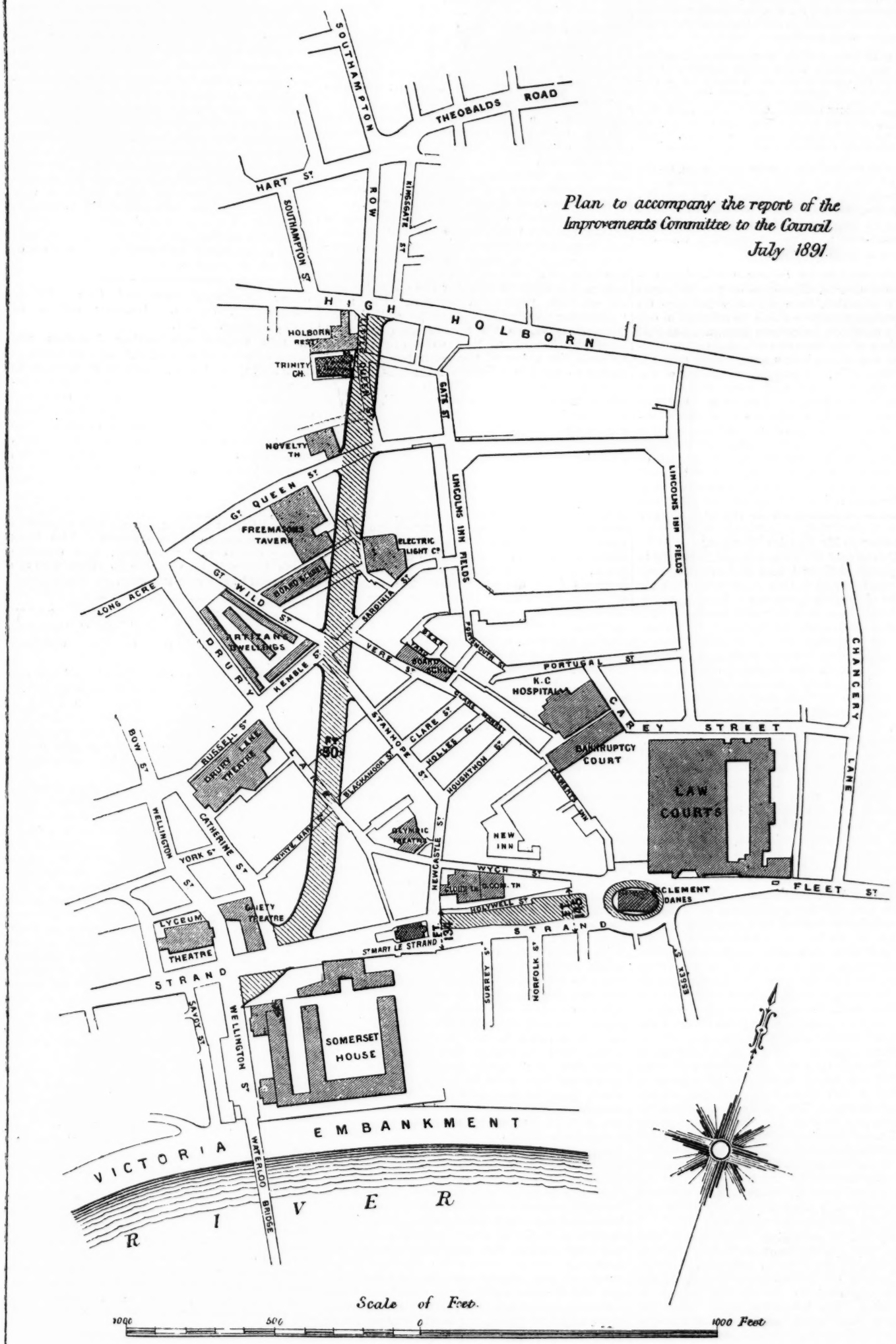
Mr. Thomas Lee acted as clerk of the works under the direction of the architect. Messrs. Kirk & Randall, of Woolwich, are the general contractors. Messrs. James Simpson & Co., Limited, supplied the engine, boilers, and swimming-bath arrangements, and the Thames Iron Works and Shipbuilding Company the constructive ironwork. The warming and lighting, cooking appliances, and other fittings were executed by Mr. W. G. Cannon; the chemical working and lecture benches, lockers, &c., by Mr. Thomas Mitchell. The Art Department general class and lecture-rooms were principally fitted by the North of England School Furnishing Company and Messrs. Hammer, and the library by Messrs. Wake & Dean, the latter room being also fitted with the ingenious "Indicator" of Mr. Cotgreave. The running-track and general ground work have been carried out by Mr. George Neal, of Wandsworth.

THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of this Council was held on Tuesday afternoon last, at Spring-gardens, Sir John Lubbock, the Chairman, presiding.

Proposed Tramways over Westminster Bridge and on the Embankment.—The Highways Committee submitted the following report:—

"The Council, on April 21 last, upon a report from us with reference to the London Tramways Company (Extensions) Bill of this session, resolved to consent to the Bill going forward, provided that, among other amendments, clauses were inserted authorising the transference to the Council, if the Council should so decide, of the powers sought by the Bill for the construction and maintenance of tramways across Westminster Bridge and part of the Victoria Embankment, and, in the case of such transfer, for the user by the London Tramways Company and by any others with which the Council might see fit to enter into arrangements, of the lines of tramways when constructed upon payment of a rent to be agreed upon. It will be in the recollection of the Council that this Bill was rejected on second reading in the House of Commons, and so was lost for the present session. There is very little doubt that unless the Council itself takes action in the matter, the Company will, having regard to the public demands for this line of tramway, especially from residents in the southern districts of the County of London, reintroduce its Bill next session. We are still of the opinion expressed in our report above referred to, that, inasmuch as the bridge and



Plan to accompany the report of the Improvements Committee to the Council July 1891

Plan of New Street from Holborn to the Strand, as recommended by the Improvements Committee for adoption by the London County Council.

the embankment are vested in the Council, the line of tramway, if sanctioned by Parliament, should be constructed by, and be entirely under the control of, the Council as the local authority; and we therefore recommend—

'That it be referred to the Parliamentary Committee to give the necessary notice of the intention of the Council to introduce a Bill or to apply for a Provisional Order next session, to authorise the Council to construct a tramway across Westminster Bridge and along the Victoria Embankment, and to enter into agreements with the London Tramways Company, the South London Tramways Company, and others, for the leasing and working of the line when constructed.'"

This was agreed to after some discussion, in the course of which an amendment was moved by Mr. Beachcroft, to the effect that no branch-lines or extensions should be allowed to be constructed at any future time in Bridge-street or Parliament-street. The amendment was defeated by a large majority.

The Proposed Street Improvement Schemes.—Mr. Henry Clarke, Chairman of the Improvements Committee, then formally brought up the important report to which we referred in our last, and of which, indeed, we then gave detailed particulars of the first two schemes of improvement on the Committee's programme (see pp. 50, 51, *ante*), viz., the proposed widening of the Strand and the proposed new street from Holborn to the Strand. But from what was subsequently said, it appears that the Committee does not propose to recommend the execution of the schemes in the order in which they appear on the programme, the making of the proposed street from Holborn to the Strand (see plan, page 69) being deferred until after the completion of some of the other improvements recommended in the Committee's report.

In answer to Mr. Charles Harrison,

Mr. Clarke said the plan adopted in regard to these proposed Strand and Holborn improvements was to avoid taking more property than would be absolutely necessary. This, however, would leave them with valuable frontages with which to secure some recoupment. The Committee was of opinion that the system of buying adjoining property for the purpose of recoupment would not, in this instance, offer any advantage. No special estimate had been made of the probable cost of the improvement, provided the alternative system were adopted,—namely, of acquiring additional property for recoupment, the valuer advising the Committee of the hopelessness of such a proceeding in this case. It would be an advantage in some instances to acquire more property than was necessary for the construction of a street. But the Council would be surprised at the results of that system. It was adopted in the construction of the Charing Cross-road, and the Charing Cross-road cost 87,000*l.* more than it would have cost had only the land been bought which was necessary for its construction, the fact being that the cost of the acquisition of tenants' rights and the amount of compensation was so large as to make it unremunerative for the Council to acquire more property than was necessary for the construction of a street. With regard to the financial aspect of the recommendation, he thought the Council would give the Committee credit for having been very straightforward and for placing the figures before them in the most disadvantageous light, and viewed in the worst aspects. Of course, it must occur to the Council that the expenditure of over 2,000,000*l.* of money could not take place in one year if the Council passed the several recommendations. The amount would have to be divided over four or five years. The policy of the Council had been to husband its resources and to contribute very little to local improvements, to encourage the local bodies to effect small improvements for themselves, so that the Council should have the more money to devote to large and grand metropolitan improvements, such as were now placed before them.

Mr. Clarke, in answer to further questions, said the first improvement in order would be the widening of the Strand; secondly, Bozier's-court (corner of Tottenham-court-road); the southern approach to the Tower Bridge he placed third. The new street from Holborn to the Strand would come next, and then followed in order the Nine Elms-lane improvement, and the Wandsworth-road, Battersea-park, and York-road improvements.

Owing to the great length of time occupied in the discussion of other matters, the further discussion of the report was adjourned to a special meeting to be held this Friday, the 24th.

Books.

Plumbing Practice. By J. WRIGHT CLARKE, Lecturer on Technical, and Instructor in Practical, Plumbing at the Polytechnic, London, First National Honours Medallist for Plumbers' Work, 1881. London: *Engineering and Building Record.* 1891.

THIS, the second edition of a treatise containing the subject-matter of a series of papers contributed to our American contemporary, the *Engineering and Building Record*, is nevertheless based upon British plumbing practice, and may fairly hold a very high position amongst technical manuals.

A careful study of this work will not only be of the highest value to the working plumber, but its perusal would enable any architect, contractor, or clerk of works, in short, anyone who has to superintend the work of the plumber, to tell in ten minutes whether the operative was an efficient tradesman or not. The term "plumbing practice," is perhaps a little too comprehensive, as the author does not deal with any branch of lead work appertaining to roofs, the scope of the work being limited rather to what is generally known as internal or sanitary plumbing. Within the limits to which the writer has confined himself, it would be difficult to find a work which more clearly, more fully, and yet at the same time concisely, deals with the whole art and mystery of the plumber as far as his working with pipes is concerned. The author commences with a very brief and well-condensed description of the material that plumbers employ, which, without containing any irrelevant matter, is amply sufficient for the proper comprehension of the peculiarities of lead. Lead pipes are then dealt with, both machine-made and hand-made, with the advantages of the different methods fully discussed, and the technique of the operations thoroughly gone into. From pipes our author passes to the various methods of bending pipes and of forming elbows, including a clear and accurate description of the solid geometry required by the plumber. We then have a full account of joint making, particularly the various applications of wiped joints, and the method of their formation, which, as the writer justly implies, is the proper way of forming connexions with pipes. The author is with justice severe on the "scores of quacks who go about usurping the title of plumber, who make theirs with a copper bit, and could not wipe a joint if they tried." We note that the writer does not speak so severely of blow-pipe joints, but we have frequently found that quack plumbers are rather fond of making indifferent blow-pipe joints, although we are quite prepared to admit that a well made blow-pipe joint may be superior to an ordinary copper bit joint. As the author points out, in the making of blow-pipe joints "care should be taken that the socket is filled with solder, and the heat so great as to insure its tinning to the lead right down to the bottom;" this is just what the quack plumber omits to do. While on the subject of joints, we should have liked to see discussed the methods of making, and the disadvantages of putty joints and of other methods of connecting fittings with lead pipes. Having discussed the matter of joints, our author proceeds with the fixing of pipes to a wall both vertically and horizontally; we note that the writer speaks in favour of galvanised iron nails in fixing lead rain-water pipes, but this is hardly consistent with the admission, which we find further on, that in the case of galvanised iron rain-water pipes "very little faith can be placed in the waterproof coating." This is perfectly true, and applies equally to galvanised iron nails. The chapters on the lining of sinks and cisterns should be read by every architect, as they contain many valuable hints which are not generally borne in mind. Our author next proceeds to a discussion of the questions affecting sewerage and house-drains, with their various traps, and, naturally enough, shows the superior advantages of iron drains over stoneware. The question of drain ventilation is well and fairly discussed, and several mistaken theories, which commonly find credence, are well exposed, such as the so-called syphon action of long and short ventilating pipes, and also the value that is often falsely ascribed to cowls on the top of soil-pipes. In the chapters on drain ventilation occurs a reference to what is really one of the best points about this book, that "this work is intended to be on principles, and not inventions." The author is certainly to be congratulated upon the very able manner in which he has pointed out the advantages and disadvantages of various applications of principles, without in any way advertising particular inventions. Hence the value of the work to the *bonâ-fide* architectural student. Continuing the subject of drainage, traps for surface-water and waste-pipes are well treated. The writer then proceeds to put clearly before his readers the various points that should be noted in the construction of slop-sinks, baths, wash-hand-basins, and urinals. Soil-pipes and their traps are then dealt with, and then water-closets. The work finally concludes with a short account of hot-water supply. Thus we have within a very reasonable compass, fully and lucidly explained, the detail of the plumbers' craft as affecting internal or sanitary work in a clear and readable book, which should be found on the shelves of every architectural student.

Wire: its Manufacture and Uses. By J. BUCKNALL SMITH. London: Offices of *Engineering*. 1891.

IN this treatise the author describes the manufacture and uses of the various kinds of plain and worked wire, which is required in so many industries at the present day. Some interesting information is given in an introductory chapter, dealing with the history of the subject, after which Mr. Smith proceeds to explain the manufacture of not only iron and steel wire, but also the more delicate productions in bronze, copper, brass, platinum, and other precious metals. The different gauges for measuring the diameters of wires are considered at some length, and a large amount of attention is given to the different construction of wire ropes and their serviceable employments. The book throughout is well illustrated, and contains much that will be valuable to those who are interested in the wire industry.

Water-Pipe Discharge Diagrams. By E. BROUGH TAYLOR, M.I.C.E., and G. MIDGLEY TAYLOR, A.M.I.C.E. London: Batsford. 1891.

IN order to save the trouble of working out formulæ to ascertain the discharges of water-mains, the authors have prepared a series of diagrams which show the relations between the diameters of the pipes, the hydraulic gradients, and the discharges, so that when any two of these are known the third can be ascertained at once by inspection.

The diagrams only apply to pipes running full under a constant head. They have been constructed from the formula of Herr Kutter, of Berne, which the authors have been able to satisfy themselves, by a number of experiments made with mains of various diameters, gives truer and more consistent results than the older formulæ. The experiments carried out by the authors were made with mains of uncoated cast-iron which had been in the ground some years, and many of which included in their length a fair proportion of easy bends and undulations as generally occur in actual practice. The diagrams, consequently, apply to water-mains as ordinarily laid, with bends and other irregularities, rather than to tubes which are laid with the greatest care in straight lines, and with uniform slopes.

There are in all twelve different plates, giving the discharges of pipes from 2 in. in diameter up to 48 in. in diameter; the first seven diagrams refer to gradients ranging from zero up to 5 per 1,000, while the remaining five diagrams cover a limited range of heads from zero up to 1 per 1,000. In addition to these plates, there are two others, giving the proper weight and thickness of metal for cast-iron tubes of various diameters, under different pressures.

Engineers and others, who often have occasion to make calculations in connexion with the discharge of pipes, should feel grateful to the authors for publishing in such an excellent way so much reliable information, for the diagrams in the book will not only serve as a check on their own figures, but they will on mere inspection give them all the information on the subject they are likely to require in practice.

Notes on House Drainage. By CHARLES J. TAIT. Exeter: W. Pollard & Co. 1890.

THIS is a small quarto pamphlet containing elementary remarks on drainage, with a few simple diagrams. It is only a few pages, but

may be useful to give first notions on the subject to householders. Generally speaking the advice given in it is sound; but in speaking of jointing drain-pipes, the author, while condemning the ordinary and perfunctory method of making cement joints, does not mention the most recent and effectual methods of jointing.

Tourists' Guide to the Continent: Walks in Holland: Holidays in Belgium: Walks in Epping Forest. Percy Lindley; 1891.

THESE are a series of cheap handbooks of holiday travel, pleasantly written, and, for the price at which they are issued, very creditably illustrated. A large proportion of the sketches are of ancient architecture in the localities dealt with.

Correspondence.

To the Editor of THE BUILDER.

"PROPOSED HOUSE AT HAMPSTEAD."

SIR,—I am obliged for the flattering interest taken in me by the gentleman who writes to you behind the *nom de plume* of "Cubit," when criticising the design and estimate for a "Proposed House at Hampstead," which you republished from my book on "Bungalows and Country Residences."

I should thank Mr. "Cubit" of the "wide experience" for having given up his valuable time to cubing out the building, but before impugning my estimates he should have asked a friend to check his figures, when he would have found that they alone are at fault. I trust that the spare time he has for gratifying his *cacoethes scribendi* is not due to similar inaccuracies, against which he is good enough to warn me—I am happy to say, needlessly.

It is unfortunate that facts are opposed both to his theory of the way I arrived at my estimate of the building, and to his estimate of cost, but the cubical contents (taken from below the footings, and including all the bays, verandahs, and colonnades) amount to only 75,000 ft. (odd), instead of 100,000 as he calculates. This, at 8d. (a very fair price for the class of building), brings out the total to 2,500*l.*, and at this price a substantial builder was willing to carry out the work.

Speaking generally as to the estimates in my book, a large number of the designs represent houses which have already been built, and in some instances the contract prices have been *below* the estimates given.

Reverting, therefore, to Mr. "Cubit," my advice to him is, cube it, and cube it again, but cube it—correctly.

R. A. BRIGGS.

2, *Devonshire-square, E.C.*

The Student's Column.

MARBLES.—IV.

ROMAN MARBLES (*continued*).

OF the coloured marbles used by the Romans, we may mention three kinds:—

Marmor Numidicum, or Giallo Antico, is a beautiful yellow marble, tinted red, and occasionally marked with black or brownish yellow circular lines. Large quantities of this stone have been found in Roman buildings, and on the discovery of the old workings a few years since, by a Belgian engineer, at Chemtou, in the valley of the Medjerda, Tunis, it was soon placed on the market. The same quarries produce rose and yellow marbles, and a breccia. In one of the ancient workings, the Romans cut a large portion of the mountain away, and Mr. Brindley says that the places could be distinctly seen whence they had taken their monolith columns and hewn them roughly into shape whilst attached to the rock. These quarries were specially protected by a massive wall, remains of which still exist, together with ruins of the adjoining Roman city, but no marble was used in their construction, it having been reserved for use in the Imperial city, where 172 columns of it are yet in existence. Half of the large interior columns of the Pantheon, as well as those in the Arch of Titus, and in St. John Lateran, and the pavement in the Basilica Julia are made of it. Splendid examples of Giallo Antico may also be seen in our National Gallery in the sides and spandrels of the new staircase up to the level of the exhibition-room floor.

A yellow marble called Giallo Antico is, with several other similar stones, quarried at Kleber, a village to the north-east of Oran in Algeria. When dealing with the Algerian marbles at present in the market, we shall describe the quarries of that district in detail. For the present, we may note that there are numerous spots which evidently mark the sites of Roman quarries. Some blocks of stone have been found* actually extracted, and some with grooves and wedge-holes ready to be raised; but what is somewhat strange, there is no indication of any great monoliths having been prepared, and there is none of the usual *débris* of a quarry. Colonel Playfair is of opinion that the Emperors of Rome carefully guarded the secret of the existence of these workings, and that only comparatively small pieces of the stone were taken away, just as they were separated from the parent rock, without even any preliminary hammer-dressing. We do not, quite see the force of this observation, however, for if any one approached near to the quarries at the time the stone was being obtained, they could have observed the fresh faces of rock whether there were any heaps of *débris* or not. Moreover, there must have been abundant signs of the vicinity of the quarries along the roads leading to them, and any inquiring mind could have obtained sufficient information as to their whereabouts, at the port of shipment, which was not far off. Evidence is not wanting to prove that the marble from the district under consideration was employed in making mosaics. Is it not more probable that the pieces were taken away and utilised, when suitable, for that purpose?

The celebrated marbles known as Rosso Antico and Nero Antico share between them the Latin name Marmor Tænarium, from the circumstance that the quarries of both kinds are close together in the promontory of Tænarum in Laconia, Peloponnesus (now known as Cape Matapan). These Rosso Antico quarries have been re-opened, and the marble is now comparatively common; but other stones, more or less similar in appearance, are also known by the same name. One, for example, comes from Kleber, near the place where the Oran Giallo Antico is found, and another is worked near Rome, so that much discrimination is necessary in the identification of the original material. Like as with other ancient marbles of repute, the name is merely of generic value. Rosso Antico may be described as a uniformly-coloured deep brick-red marble, sometimes inclining to deep purplish red, with very dark streaks, and occasionally with white streaks or ribbons, and sometimes white, with red veins.

Nero Antico, as its name implies, is a deep black marble; it occasionally shows a white hair-like line, short, straight, and interrupted. The name of Grand Antique has been applied to this material, as well as to the Marmor Proconnesium, or Cyzicum. Most of the stone now known as Noir Antique is quarried at St. Crépin, in the Upper Alps.

Of all the porphyries quarried by the Romans, none were so celebrated in ancient times as the Porfido Rosso Antico or Lapis Porphyrites; and it may be said that the interest in this remarkable stone has not lessened in modern times since the discovery of the sites of the old quarries, and the introduction of the marble into the English and other markets. The history of this discovery is recorded in the Transactions of the Institute,† to which the student is referred for particulars. The main body of the stone is a purple red, containing small fragments of pale purple, occasionally almost white; and there is another kind, in which the ground is rather heavier and duller, with yellowish-white specks. The grey, black, and invisible green varieties mostly have the light specks alluded to. It contains depth with richness, and came so near the Imperial purple in tone that it was named porphyry. The quarries are near the summit of the western half of the Djebel Duchan, which mountain is within a reasonable distance of the port of Abu Shar El Kible on the Red Sea. The porphyry protrudes in massive blocks, in one place 120 ft. in width, whilst some of the choicest varieties are not more than 10 ft. in breadth. The Romans carried the stone to the Nile,—a distance of ninety-six miles. At their old station, near the quarries, an interesting dedicatory inscription in Greek of the time of Hadrian was found, which reads:—"For the safety and perpetual success of our Lord the Emperor Hadrian and his whole house, this temple and its precincts (were dedicated) to the Sun God Great Serapis, and the gods associated with him by Epaphroditus Sigerianus, a slave of the Emperor, when Rhammius Martialis was Prefect of Egypt, Marcus Ulpius Chresimus Procurator of the Quarries, and Rufus Proculeianus (Superintendent of the Marble Works)." In a similar inscription at Djebel Fatireh where Epaphroditus dedicated another temple to Serapis, A.D. 118, he is called "Lessee of the Quarries."

The quarries on Djebel Duchan are of much importance also, in shedding some light on the methods adopted by the Romans in working the stone. In one place, a square columnar mass was found half wedged off by a series of holes up the vertical face of the rock. "If," Mr. Brindley remarks, "the Romans had used wooden wedges, as many think they did, they could not have water-soaked them in this position." Some of the blocks show that these people not only wedged, scabbled, and chisled, as is now done, but that they even sawed blocks of this hard material asunder.

We have no space to enumerate the different wide-spread examples of ancient works in porphyry, but there cannot be less than 300 monolith pillars of the material still preserved in Europe, whilst it is also found in Asia as far as Baalbec and Palmyra. Many porphyry statues exist, of the time of Claudius especially. The Pantheon, the temple of Venus, the Baths of Caracalla, the Temple of the Sun, the Palace of the Cæsars, and later, the Basilica and Baptistry of Constantine, as well as numerous churches in Rome and Italy generally, more particularly St. Mark's at Venice, provide examples of pillars and wall-linings of this handsome stone. It was also extensively employed for sarcophagi, and even in the draping of figures and statues. Inside the principal entrance to St. Peter's, and inserted in the marble floor, is a circular slab of porphyry, 8 ft. 6 in. in diameter, upon which, it is stated, the Emperors, from Charlemagne downwards were crowned, and certain official acts were also performed upon it by the Popes. In the British Museum is a broken pillar of the first century, in this material, which probably belonged to the Elgin collection; and many other examples of the stone are in the hands of private collectors in this country.

Other porphyries used by the Romans, and generically known to them as Lapis Porphyrites, were the Porfido Nero (of the Italians), with white spots; Porfido Bigio, spotted with circular white and square black marks; Porfido Verde, of a kind of invisible green with light spots; and Lapis Memphitis, or Serpentino Bigio, a grey porphyry with black spots, said to have come from Memphis.

The Lapis Lacedæmonius, or Marmor Lacedæmonium Viride of Pliny, or Porfido Verde detto Serpentino, is a green porphyry which came from Laconia, in the Peloponnesus. Ancient quarries have been found between Sparta and Marathon. It is a material which has entered largely into decorative work from very ancient times, especially in pavements of Opus Alexandrinum and inlays. Among other works, it is used with grey lava and Egyptian porphyry in the pavement of the piazza of St. Peter's. M. Delesse, who has subjected the stone to a close examination, states* that it is composed of Labrador felspar and augite with titano-ferrite; it would therefore appear to be a species of basalt-porphyry. Its colour is a deep yellowish-green, with elongated fragments of a lighter tint.

Of the basalts used by the Romans, we may only mention two of the principal kinds, Lapis Basanites, or Basalte Propriamente Detto; and Lapis Lydius, or Pietra di Paragone. Stones of this class, including dolerites and diorites, were employed for various decorative purposes, as is well exemplified by Egyptian specimens in the British Museum. The celebrated "Rosetta stone" is a compact, but variable, diorite. There is a statue of Apollo in the Museum, of compact black diorite (basalt), which is probably a representative of the stone referred to as the "basanites" from Æthiopia by Pliny. In alluding to the difficulty attending the proper recognition of stones of this kind from the descriptions of ancient authors, Professor Rupert Jones says† that "basanos" was the Lydian touchstone (lydite), and the Æthiopian stone was named after it on account of its blackness and approximate hardness. In this case "basanites" would not include the "basalt" of modern lithologists, for this is not so compact as the black dioritic green stone of Egypt, and it contains augite instead

* Lee. "Marble and Marble Workers," 1888, p. 90.
† Brindley. "Trans. Roy. Inst. Brit. Arch." Vol. iv. N.S. (1888), pp. 5, *et seq.*

* Delesse. See Hull, "Building and Ornam. Stones," 1872. p. 74.
† Rupert Jones, "Proc. Geol. Assoc." vol. viii. (1884), p. 366.

of hornblende. Pliny, however, refers also to an Æthiopian stone called "basaltes" of the colour and hardness of iron, from which (he says) it derives its name. Prof. Aitchison, A.R.A., mentions * (not with reference to the foregoing, however) that it is said to be so-called from "basal," the Ethiopian for "iron," —an observation of much interest to geologists, to whom the origin of the word "basalt" has hitherto been an enigma. The Æthiopian basalts were black, dark brown, and green.

In the Gallery of the Uffizi, in Florence, there are many excellent illustrations of the various uses to which basalt was put by the Romans.

GENERAL BUILDING NEWS.

SHEFFIELD.—At the last meeting of the Sheffield School Board, the Chairman (Mr. J. D. Leader) announced that the successful architect in the competition for plans for the additions to the Central School, the new elementary school in place of Carver-street School, and other necessary buildings to be erected in Holly-street, was Mr. J. B. Mitchell-Withers, whose motto was "Labore et Perseverantia;" and the Buildings Committee recommend that the sum of ten guineas be awarded to Mr. C. J. Innocent, whose plans came next in order of merit. The site has extensive frontages to Orchard-lane, Holly-street, and Bow-street, and the additional buildings will include the following departments:—Basement: Cookery classes, dining-rooms, joiners' shop, and metal-working shop, and laundry. Ground floor: Machine, drawing, and lecture rooms to accommodate 120 students, physical laboratory, and lecture-rooms for fifty students. First floor: Chemical laboratories for 140 students, and lecture-room, balance-room, and other necessary stores; the present school being modified to suit the new arrangements. The Peripatetic Demonstrators' Department at the corner of Orchard-lane and Holly-street contains preparation room, joiners' shop, offices, and stores, with the caretaker's house adjoining. The elementary school building is placed at the corner of Holly-street and Bow-street. The accommodation provided is for 292 infants on the ground-floor, and with a mixed school for 250 on the first-floor. A play-ground is provided on the top of the building, and the basement is devoted to workshops and playsheds. The style adopted for the buildings is that of the English Renaissance to harmonise with the present schools and offices, which are designed by Mr. E. R. Robson, F.S.A.

THE NEW POLICE OFFICES, BIRMINGHAM.—The *Birmingham Gazette* says that the special sub-committee, consisting of Mr. Wilders, Alderman Hart, and Alderman Sam Edwards, to whom has been delegated the consideration of the arrangements for the erection of the new police offices in Corporation-street, adjoining the new Victoria Courts, together with Mr. Farndale, Chief of Police, met the architects of the Victoria Courts, Messrs. Aston Webb and Ingress Bell, to whom the work of preparing the plans of the building has been entrusted. As the result of the interview, the architects will at once proceed with their work, the instructions being that the plans are to harmonise with the Victoria Courts, and the total cost of the new offices is not to exceed 10,000*l*. It is expected that the Watch Committee will be able to lay the plans before the City Council in the course of a few weeks.

THE BATTERSEA POLYTECHNIC.—The foundation stone of the Battersea Polytechnic was laid on Monday by the Prince of Wales. Mr. E. W. Mountford is the architect of the building, of which we gave a view and ground-plan in the *Builder* for March 28 last.

NEW WESLEYAN CHURCH AT WESTBURY PARK, BRISTOL.—On the 9th inst. opening services in connexion with the new church which has been built by the Wesleyan body at Westbury Park were held. The building is in the Early Decorated Gothic style, and stands parallel to Berkeley road, with the west front towards Etloe-road. The exterior walls are faced with hammer-dressed Pennant stone and Coombe Down stone dressings, the roof being covered with purple Bangor slates; the ridges will be finished with red terra-cotta cresting. The nave is 33 ft. wide, 62 ft. long (exclusive of lobbies at the west end), and 43 ft. across the transepts, the height being 34 ft. The chancel is 19 ft. wide, and terminates in apsidal form with three lancet lights. A vestry, 18 ft. by 11 ft. 6 in., and lecture-hall 29 ft. 6 in. by 18 ft., together with heating-chamber in the basement, are also comprised in the scheme. The glass in the traceried windows has been executed from the architect's sketches by Messrs. Joseph Bell & Sons, of College Green. The Beatitudes, with suitable emblems, are introduced into the nave windows, and the chancel and large windows in the south transept, together with the west windows, are variously treated, all being of different design. The roof is of semi-octagonal form, with curved ribs, executed in pitch-pine with plaster panels; the ends of main ribs are supported on columns with moulded capitals and carved corbels in the form of angels. The seating is in pitch-pine varnished. The aisles are laid with pitch-pine wood-blocks. The chancel has an encaustic tile pavement, specially designed by the architect, and laid by Messrs. Maw & Co. The building is warmed by means of the high pressure hot water system, and the lecture-hall by means of two of Musgrave & Co.'s slow combustion stoves. As to ventilation two of Messrs. Kershaw's ventilators will be employed to exhaust the vitiated air. The gas-fittings are of decorated iron, by Messrs. Brawn & Co., of Birmingham, who also executed the standards for the communion rail. The stone carving was entrusted to Messrs. Davey & Bushell, of Bristol. The present contract amounts to about 3,200*l*., and was undertaken by Mr. T. R. Lewis, of Hotwells. The architect is Mr. H. Dare Bryan, College-green, Bristol.

ST. MARK'S CHURCH, DUNDELA.—The new chancel and transepts, which have been erected as a memorial to the late Sir William Ewart, M.P., at St. Mark's Church, Dundela, in the North of Ireland, were consecrated on the 5th inst. The new memorial chancel is 36 ft. long, by 25 ft. broad, and the transepts are each about 20 ft. long. The chancel roof is continued at the same height (of about 60 ft.) as is the nave roof. The architect from whose designs and under whose own supervision the new buildings have been erected, is Mr. William Butterfield, of London. The builders were Messrs. H. and J. Martin.

ST. FRIDESWIDE'S MISSION-HOUSE, BROMLEY-BY-BOW.—This building, to be erected on a site in Lodore-street, E., has been commenced, the foundation-stone having been laid on the 9th inst. by Miss Phillimore, a sister of Sir Walter Phillimore, Q.C., who is giving the site and providing the means of building the house itself. The building is to be erected for the accommodation of Sisters trained in the House of Mercy, Clewer, near Windsor. The foundation-stone laid on the 9th inst. at the north-west angle of the building is of red Corsehill, and bears the inscription, "St. Frideswide's Mission House" on the Lodore-street face, having a raised cross in the centre; the inscription next Duff's-fields being "Laid 9th July, 1891." The building (according to the *East End News*) will be a complete example of this purely modern type of building, everything being arranged with a view of separating the different sections of the building at ordinary times, while communication with all parts is secured when required. It will contain on the lower story a spacious club-room and recreation-room for girls, a soup-kitchen, and a parish room. The community's refectory, kitchen, scullery, and offices will also be placed on the same floor. By passing through the open yard, the Church of St. Frideswide adjoining will be reached by the community without it being necessary to go into the street. On the next story there will be a sitting-room and two bedrooms for lady workers in the parish, a private room for the Sister in charge, the sitting-room for the community, and a small oratory adjoining the church. There will also be a guild-room for girls, reached by a separate staircase placed next to the room for the Sister in charge. Two-pair story: Nine bedrooms, work-room, bath-room, &c. The exterior of the building will be intentionally simple. The object in view has been to secure a good outline and an easy, home-like appearance. The only feature of importance will be the main entrance for the community in Lodore-street. The elevation will be of blue Staffordshire bricks, to a height of 4 ft. above the pavement, and above that height of yellow with an admixture of red bricks. Messrs. Clarkson, of Poplar and Great Ormond-street, are the architects.

SANITARY AND ENGINEERING NEWS.

SEWERAGE AND SEWERAGE-DISPOSAL AT CARSHALTON.—An inquiry has just been held at Carshalton by Mr. Samuel Joseph Smith, C.E., one of the Inspectors of the Local Government Board, into a proposal of the Carshalton Local Board to borrow 25,000*l*. for works of sewerage and sewage-disposal. The scheme was opposed by an influential committee of ratepayers. The chairman of the committee (Mr. J. W. F. B. Taylor, lord of the manor) and the hon. sec. (Mr. E. H. Bourchier) were present. Mr. Barnard Lailey, instructed by Messrs. Cave & Co., of 4, Fenchurch-street, E.C., appeared to oppose the scheme. Evidence in support of the scheme having been given by Mr. Heward, the Surveyor to the Local Board, and Mr. Bruges, C.E., Mr. Urban Smith, C.E., stated that a gravitation scheme was possible, and that the costly pumping-works proposed were unnecessary. The report of the Inspector will be issued in due course.

OUNDLE WATERWORKS.—The Local Government Board have given their sanction to a scheme for the water-supply of Oundle, prepared by Mr. W. H. Radford, C.E. The decision as to the sewerage scheme is expected shortly.

WATERWORKS, LINLITHGOW.—New waterworks for the burgh of Linlithgow, situated on the Preston estate, about a mile and a half from the town, have been opened. The works, which were carried out under a Provisional Order confirmed by Act of Parliament in August, 1889, embrace two separate intake channels, a storage reservoir, a filter and service tank, a separate conduit for the Hiltly springs, and supply and distributing pipes. The main supply is derived from the gathering ground in and around Cocklerey, extending to about 230 acres, the water from which is caught in two intake or catchwater channels, and led into the reservoir. The filter has a maximum filtering capacity of 130,000 gallons per day, and suitable gauges are provided for adjusting the rate of filtration to the requirements of the burgh. The service-tank has a capacity of fully 300,000 gallons. With the exception of the cope, which is of freestone, both filter and tank are constructed of concrete and granolithic, the latter being placed in the moulds simultaneously with the concrete, and floated off on the surface as soon as the moulds could be removed. The total cost of the works amounts to 6,600*l*. Excepting the tower piping, the contract has been carried out by Mr. Thomas Peattie, contractor, Bo'ness. Mr. R. C. Brebner, contractor, Edinburgh, laid the distributing pipes in the town, and the valves, hydrants, &c., were provided by the Glenfield Company, Kilmarnock. The whole of the works were designed by and carried out under the supervision of John A. Warren, Assoc. M.Inst. C.E., civil engineer, Glasgow, and Mr. Hugh Wilson was resident inspector of the work.

FOREIGN AND COLONIAL.

FRANCE.—M. Eugène Mouchon, medallist, has been commissioned by the Government to execute the new postage stamps for the French colonies. ——A new Greek church is being constructed in Paris in the Rue Bizet.——There has been placed in the old market at Rouen a granite tablet with an inscription stating that it was here that Joan of Arc suffered death at the stake.——On Sunday last the line from Tournon to Samastre was opened. This line, thirty-three kilomètres long, is intended to complete the Vivarais railway system.——A large and powerful lift is being constructed at Marseilles to permit easy and quick access to the church of Notre Dame de la Garde. This lift, which rather recalls those of the Eiffel Tower, works over an inclined plane 84 mètres in length, leading to a covered passage-way constructed between the Eiffel ateliers. The work is being executed under the direction of M. Maslin, engineer, and is expected to be in working order by the end of the year.——The monument to the memory of General Raoult has been inaugurated at Meaux. ——The monument to Admiral Jacob (M. Albert Lefeuvre sculptor), will be inaugurated at Livry on August 16.——A curious rapier of sixteenth-century date has been found in the Seine, with the arms of the house of Biron delicately chased on the hilt. ——The Château of Asnières, near Bonneville, has been burned. Only four walls now remain of this elegant sixteenth-century building.——The Société Artistique of St. Maur-les-Fosses is to open on the 26th an art exhibition, to close on August 16. ——The Société des Amis des Arts of Versailles has opened its thirty-eighth exhibition in the Galérie des Maréchaux of the Palace.——On August 1 an art exhibition, of which M. Detaille is the president, is to be opened at St. Germain-en-laye.—The exhibition of Fine Arts at Lille will be opened on August 15, to close on September 30. ——The Porte de Paris, at Lille, is to be restored shortly. It dates from 1862.——The Minister of the Interior went last Sunday to Avignon to inaugurate the monument commemorating the centenary of the annexation of the Comtab-Venaissin with France. The monument is designed by MM. Felix Charpentier and Férigoule. ——M. Emile Trélat, the well-known sanitary architect, has been elected member of the Chamber of Deputies, representing the Fifth arrondissement. ——M. Albert Granger, architect, has died at Paris, at the age of 44. He was a pupil of Vaudremer, and a member of the Société Centrale, and one of the most ardent promoters of the "Caisse de défense mutuelle des Architectes," founded in 1884.—— The Town Council of Toul has decided on opening a public competition for a design for a monumental fountain, to cost 30,000 francs.——The competition for a covered market at Epinal has been decided. Ten designs were sent in, and the work has been entrusted to M. Clasquin of Epinal; the second premium to M. Mouginol of Epinal, and the third to M. Georges Hennequin of Paris. The cost is estimated at 247,000 francs.——The "Union Syndicale" of Architects of Paris is about to bring out shortly a monograph of the Château of St. Germain, composed of about 100 plates which figured in the exhibition of the works of Laisné, Millet, and Ruprich-Robert.

NORWAY.—The Norwegian Storthing has decided to postpone till next session the question relating to the erection of new Government buildings in Christiania, there being a great deal of difference of opinion as to the relative merits of the two designs in hand.——A new law relating to the building of houses is before the Parliament, but it will not apply to the cities of Christiania, Bergen, and Throndbjem, where special regulations are in force. However, the leading Norwegian organ, the *Morgenblad*, condemns the measure as being far too severe and tending to hamper builders in their task, besides entailing extra expenditure for supervision to smaller towns.——We have on previous occasions referred to complaints by Norwegian architects over the manner in which the competitions for public buildings are carried out,

* Aitchison, *Builder*, vol. lvi. (1889), p. 183.

and now similar complaints are made in the *Morgenblad* by an architect, Herr. Andr. Bugge, in regard to the competition for the permanent industrial exhibition building in Bergen. He complains that only two months were allowed for preparing the plans, and when half that time has elapsed, the committee made a serious alteration in the programme, thus wasting the time of nearly all the competitors.——Quite a building mania has, it seems, seized upon the town of Bergen. Everywhere handsome modern buildings are being raised, and old wooden houses pulled down. This, again, has caused an active working of the sandstone and granite quarries found in the province of Bergen, whence the stone has also been delivered for the new Cathedral and Bourse, as well as the restoration of the "Haco Hall," a Norse Royal palace.——A new Custom-house is to be built in Throndhjem; and at Aaseral, a large new hotel and sanatorium, situated 1,100 ft. above sea-level, has just been opened. —— A valuable deposit of white marble, of excellent quality, has been discovered at Halsvik, in Björnör, on the west coast, situated close to a good natural harbour.

MISCELLANEOUS.

THE SOCIETY OF ENGINEERS.—An extremely interesting visit was made by a large party of the members of the Society of Engineers, on Wednesday, July 22, 1891, to the School of Military Engineering at Chatham. Among those present were Mr. W. N. Colam (President), Mr. J. W. Wilson, jun., and Mr. George A. Goodwin (Vice-Presidents), Mr. Henry Adams, Mr. Charles Gandon, and Professor Henry Robinson (Past Presidents), and Mr. G. A. Pryce Cuxson (Secretary). After inspecting the Geological Museum and various relics of the late Major-General C. Gordon, C.B., R.E., the party was entertained at luncheon at mess by the Commandant and Officers of the Royal Engineers, and afterwards the Schools of Fortification, Surveying, Tactics, Construction, Printing, Lithography, and Photography, the Model Sheds, Mechanical Workshops, R.E. Park, Field Works, Siege Batteries, Treble Sling Bridge, and the Submarine mining establishment were visited. Experiments in the penetration of the magazine-rifle, the arrangement of landmines, the demolition of rails and stockades, and the explosion of submarine mines, specially arranged for the occasion, were witnessed with much interest. 17, Victoria-street, Westminster, S.W. July 22, 1891.

THE HOME IRON TRADE.—There is no apparent change in the lethargic condition of the English iron market. Business continues to be restricted to hand-to-mouth requirements, and prices are in many instances barely maintained. No. 3 Middlesbrough pig is quoted 9d. lower than last week, and mixed numbers of Bessemer pig have declined 6d. Scotch makers' iron is very quiet, and several brands have been reduced in price. Business in the Glasgow warrant market is still stagnant. There is no alteration observable in the manufactured iron trade, and the tinplate market is also dormant. The steel trade is still dull, and rails have gone down 2s. 6d. in the North-west. Shipbuilders and engineers continue fairly employed.—*Iron.*

DOVER HARBOUR.—The Dover Harbour Bill having passed both Houses of Parliament, we can now, without fear of any "slip between the cup and the lip," congratulate the town on the opening of a brighter prospect for Dover. There have been Harbour Bills before which have produced no result, but the Act now obtained is of another sort; it is not merely a statute giving authority to construct a harbour, but it actually provides the means to do it. The money will be borrowed on the security of an income which the Act provides, and we doubt not but that the bold financial genius of Sir William Crundall, to whom much of the credit for originating the scheme is due, will assist the Harbour Board in bringing the Act quickly into practical operation. The next steps to be taken are clear. While Sir John Coode is preparing the working drawings, and providing for tenders, the provisions of the Act for transferring the Admiralty Pier to the Harbour Board will have to be negotiated, in which business our new Lord Warden will be able to render great assistance, and then, with the exercise of reasonable promptitude, next spring may see a thousand men at work on Dover Harbour.—*Dover Express.*

A TALL FIRE-ESCAPE.—The Birmingham Corporation have just ordered a new fire-escape capable of extension to 70 ft. in height, for use by the fire-brigade in connexion with the lofty buildings in the centre of the city. The escape will be constructed by Messrs. Shand, Mason, & Co., of London, on their patent "Lattice Girder" principle.

MATHESON & GRANT'S ENGINEERING TRADES' REPORT.—Messrs. Matheson & Grant, in their half-yearly report, dated July 16, 1891, say:—"The active and prosperous condition of the engineering trades last year, which we referred to in our January report as being likely to last some time longer, has continued in most of the important branches. There are, however, conspicuous signs that the demand for the products of the engineering factories is diminishing; much of the work in hand is only for the completion of last year's contracts; and the inquiries which precede new orders are every week becoming less numerous. There are two significant indications of slackening trade in the lessening demand for iron and steel for new operations, and in the scarcity of those purchases of machinery and plant for factory extension which accumulating profits and a promising future always encourage." In structural steel and ironwork, "all the leading works have been busy, and are only beginning to feel in the increasing keenness of competition the falling off in the demand. Meanwhile the very low prices of rolled steel and iron, as well as of galvanised sheets, tend still further to reduce the cost of bridges and roofs. During the last few months considerable orders have been given out for India and the colonies, but the activity of the last year has been largely due to the home demand. The replacement and widening of railway bridges, the construction of the opening-bridges on the Manchester Ship Canal, the erection of buildings at steel works and iron works, and the structural framework of hotels and theatres, are among the principal forms in which this branch of the trade has been occupied." As to Portland cement, the report says:—"This trade is at present in a condition peculiarly unfortunate for the makers, the majority of whose works are situated on the Thames and on the Medway. The demand is good, but the prices are unremunerative. The cost of production depends mainly on that of coke fuel, the price of which, following the increased cost of coal, has risen so high as to leave no profit on cement at the present selling rates. Heretofore, the cement makers, who are the chief consumers of the coke from the London Gas Works, have largely controlled the price of it; but now the Gas Companies prefer to export the coke at a low price rather than sell cheaply at home. Meanwhile the competition of the German cement makers prevents the price of the finished product rising here. The lull in the inauguration of new public works, especially of harbours and docks, tends to a lessening demand."

A WELL-DESERVED RECOGNITION.—The *British Medical Journal* says that at the last meeting of the Council of the British Medical Association, the report of the adjudicator of the prize founded by the late Dr. Patrick Stewart for important work regarding the origin, spread, and prevention of epidemic disease was adopted. The prize of 50*l.* was awarded to James Burn Russell, LL.D., M.D., of Glasgow, principally for his work in connexion with the spread of scarlet fever from milk, and other diseases from food.

PULPIT, STOKE FLEMING.—A very ornate new pulpit was recently dedicated in the Parish Church of Stoke Fleming, being the gift of a resident in the parish, having cost 300*l.* It is entirely of oak, and was executed by Messrs. Rashleigh, Pinwill, & Co., of Plymouth, from the design of Mr. Edmund Sedding.

TRADE FESTIVITIES.—The annual excursion of the *employés* of Messrs. G. H. & A. Bywaters, contractors, of King-street, Regent-street, took place on Saturday last, July 18, to Henley-on-Thames. Upwards of one hundred sat down to dinner at the Little White Hart Hotel, the chair being occupied by Mr. W. D. Bywaters, supported by Messrs. F. and A. Bywaters and the heads of the several departments. The Chairman, in response to the "Health of the Firm," expressed the hope that the same cordial relations which had existed during the past would prevail in the coming years, and said it was the intention of the junior members to maintain the harmony and good feeling which had characterised the firm under the conduct of the senior members.——The *employés* of Messrs. Jno. Smeaton, Son, & Co., to the number of about eighty, visited Hastings on Saturday last, on the occasion of their annual "Beanfeast." The dinner was served at the Royal Albion Hotel. The toast, "Prosperity to the Firm," was heartily received, and was responded to by Mr. John Smeaton. The weather was showery, but the men contrived to visit several of the local attractions, and returned to town early in the evening, having thoroughly enjoyed their outing.

LEGAL.

AN IMPORTANT POINT UNDER THE EMPLOYERS' LIABILITY ACT:

SMITH *v.* CHARLES BAKER & SONS.

THIS appeal (which came before the House of Lords on the 21st inst., present, the Lord Chancellor, and Lords Watson, Bramwell, Herschell, and Morris) raised an important question under the Employers' Liability Act.

The appellant Smith (according to the *Times* report) was a navvy, in the employ of Messrs. Baker & Sons, the respondents, who were constructing, under contract, certain works on the Halifax High Level Railway. Smith was engaged with another man at the bottom of a deep stone cutting in drilling a hole in the rock. Smith held the drill while the other man worked the hammer. On the top of the cutting there was a steam crane which raised the stones from the cutting into wagons. A chain was put round each stone and attached to the chain of the crane, and so lifted up to the top, where the arm of the crane could swing round or "jibb," on each side, and deliver the stone on a truck. On the day in question, when Smith was working as described, the crane swung over the spot where he was working, when a stone slipped from the chain, fell upon and injured him seriously. It appeared from evidence that Smith had been engaged four or five months in this particular work, but that the foreman had been told that it was not safe to let the stones be "jibbed" over the heads of the men. The foreman, however, said that he told the men that they must look out for themselves, and Smith replied, "Of course," there being no one to warn them. There was evidence that the drilling made a great noise, and that the men could not attend to their work and watch the crane at the same time; also that it was impossible for anyone in Smith's position to tell which way the crane was going to "jibb," and it was said that there ought to have been some one on the bank to warn the men of their danger.

An action was brought in the Halifax County-court by Smith against his employers, when his Honour, Judge Snagge, left certain questions to the jury, which they answered substantially in favour of the plaintiff. They found the defendants guilty of negligence, and that the plaintiff was not guilty of contributory negligence, and they assessed the damages at 100*l.* The Judge then entered a verdict for the plaintiff for that amount.

On appeal to a Divisional Court, Baron Huddleston and Mr. Justice Wills held that the judgment entered for the plaintiff by Judge Snagge should stand. The Court of Appeal, however, consisting of Lord Coleridge and Lords Justices Lindley and Lopes, reversed that decision, and gave judgment for the defendants. They were of opinion that a person who voluntarily engaged in a dangerous work undertook the risks of it, and that the plaintiff had not made out any negligence on the part of his employers which should render them liable. Hence this appeal.

The Lord Chancellor, in now giving judgment, said he did not think that the maxim *volente non fit injuria* governed this case, as he was of opinion that, looking at the evidence and the nature of the employment, the appellant did not voluntarily undertake the risk. The fact that the appellant was attending to the drill showed that he was disabled from using his eyes to see whether the crane was carrying the stone over his head, and therefore it could not be said he consented to the particular thing which led to the accident. He was of opinion that the plaintiff was entitled to recover, and he moved that the judgment of the Court of Appeal be reversed and the judgment of the county court judge be restored.

Lord Bramwell thought that no negligence had been proved against the employers, and that the respondents were entitled to judgment.

Lord Watson was of opinion that the judgment of the Court of Appeal was wrong, and ought to be reversed.

Lords Herschell and Morris concurred in that opinion.

Accordingly, by a majority of their lordships, the judgment of the Court of Appeal was reversed, and the judgment of the County Court judge restored, and the appeal allowed, with costs.

THE ST. PAUL'S REREDOS.

THE House of Lords, on the 20th inst., gave judgment in the case of "Allcroft and others *v.* the Bishop of London," an appeal from an order of the Court of Appeal, dated December 17, 1889, reversing and discharging, with costs, a judgment order of the Queen's Bench Division of June 1, 1889, that a mandamus should issue to the Bishop of London.

Their lordships affirmed the judgment of the Court of Appeal, and dismissed the appeal, with costs.

CAPITAL AND LABOUR.

PROPOSED DEFENSIVE ACTION OF THE MASTER BUILDERS.—We hear that the several Builders' Associations throughout the country are contemplating the formation of a labour federation, somewhat on the lines of the Shipping Federation.

THE LOCK-OUT OF LONDON CARPENTERS AND JOINERS.—As the result of some correspondence which has been published in the daily papers, the master builders had arranged to meet the representatives of the men on Thursday afternoon, the 23rd, but the meeting has been postponed till Monday next the 27th inst., by desire of the representatives of the workmen.

MEETINGS.

MONDAY, JULY 27.

Kent Archæological Society.—Annual Meeting. 'Assembly Room, Town Malling. 11 a.m. Excursions in the afternoon.

TUESDAY, JULY 28.

Kent Archæological Society.—Excursions, &c., continued.

WEDNESDAY, JULY 29.

Builders' Accident Insurance (Limited). — Tenth Ordinary General Meeting. 2 p.m.

FRIDAY, JULY 31.

Civil and Mechanical Engineers' Society. — Visit to the Great Eastern Railway works at Stratford (Liquid Fuel Department), and subsequently to new works for the Enlargement of Liverpool-street Station.

COMPETITIONS, CONTRACTS AND PUBLIC APPOINTMENTS.

COMPETITIONS.

Nature of Work.	By whom Advertised	Premium.	Designs to be delivered.
*Rebuilding Courthouse and Offices	Corporation of Cork	100*l.* 60*l.* 40*l.*	Aug. 28
*Public Library, Southampton	The Committee	50*l.* 25*l.*	Aug. 31
*New Municipal Buildings	Corporation of Oxford	100*l.*	Oct. 31

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
*Pulling Down and Removal of House, Stratford	West Ham Council	Lewis Angell	July 28
Goods Offices, Goole	Lanc. & York. Ry. Co.	*Official*	do.
Class-rooms, &c. Brampton School, near Wath	Trustees of Ellis' Charity	Wade & Turner	do.
Pipe Sewers	Motherwell Police Commrs.	Jas. McCallum	do.
Sewer, Main-street, Blackrock, Dublin	Township Commrs	*Official*	do.
Reservoir, Pipe-laying, &c. Earnock Colliery, near Hamilton, N.B.	John Watson, Lim.	Strain & Co.	do.
Alterations and Additions to School, Wootton-under-Edge	Governors of Grammar School	*Official*	do.
Sewering, Excavating, &c.	Runcorn Imp. Com.	do.	do.
Sewers, Flush Tank, &c.	Guar. of St. German's Union, Torpoint, Dev.	do.	July 29
Villa, Caerleon	Rev. W. M. Thomas	Geo. Rosser	do.
*Granite Sett Paving Works	Hammersmith Vestry	H. Mair	do.
*Paving and Roadmaking	Fulham Vestry	W. Sykes	do.
*Constructing Party Wall	do.	J. P. Norrington	do.
Flagging, &c.	Whitwood (Leeds) Loc. Board	J. Thornton	do.
Iron Bridge over River Skell, Bondgate	Ripon Corporation	H. Dearden	do.
Extension of Chancel and South Aisle, Highweek Church, Newton Abbot	.....	Fulford, Tait, & Harvey	do.
Ventilating Shafts and Flushing Tanks	Widnes Loc. Bd.	J. S. Sinclair	do.
Seven Houses, Brixton Ferry	Building Company	W. J. Clive	do.
Raising Level of Storage Reservoir, Cambus-lang	Lanark C. C.	W. R. Copland	do.
Dwellinghouse, South Bogbain Farm, Keith, N.B.	Sesfield Estates	.....	do.
Asphalting, &c. at Workhouse, Whiston	Guardians of Prescot Union	*Official*	July 30
Waterworks	Northwich Loc. Bd.	do.	do.
Roadway adjoining Reservoirs, Pounds, Pennycross	East Stonehouse L. B.	J. L. Hodge	do.
Cast-iron Socket Pipes	Nelson Corporation	*Official*	do.
Six Dwelling-houses, Horsforth, Leeds	.....	J. P. Kay	July 31
*Main Outfall Sewage Works	Ystradyfodwg Loc. Bd.	J. W. Jones	do.
*Iron Fencing, Entrance Gates, &c.	Borough of Brighton	F. J. C. May	do.
Manse and Offices, Glenwherry, Belfast	Rev. D. Cummins	Young & Mackenzie	do.
Work at Steading, Newton of Struthers, Kinloss, N.B.	Peter Henderson	.....	do.
Grand Stands	York Football Club	William Lewis & Son	do.
Supplying and Laying Cast-iron Water Pipes, Valves, &c.	Pontefract R.S.A.	Malcolm Paterson	do.
*Granite Kerbing and Channelling	Sandwich U.S.A.	*Official*	Aug. 1

CONTRACTS.—*Continued.*

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
Shop & House, Pentre, Rhondda Valley	B. A. George	J. J. Evans	Aug. 1
*Five Residences and three Cottages, Llandudno	Building & Workmen's Dwellings Co. Lim.	Edwin Turner	Aug. 2
Thirty Cottages, Ystrad Rhondda	Gellidawel Building Club	J. Rees	Aug. 3
Sunday School, Wheatley, Halifax	.....	James Farrar	do.
Glassworks and Warehouse, Stairfoot, near Barnsley	.....	J. P. Kay	do.
*Police Station, Superintendent's House, &c.	West Suffolk C. C.	*Official*	Aug. 4
*Painting, &c., Works, Southall Schools	St. Marylebone Guar.	do.	do.
*Earthenware Sewer Pipes	Belfast Corporation	do.	do.
Paving, &c. Chelmsford	Joint Sewerage Com.	do.	do.
*Painting, &c. Works, Leavesden Asylum	Met. Asylums Board	A. & C. Harston	do.
*Pipe Sewer and Tar-paving, Seven Sisters' Road	Tottenham Local Bd.	J. E. Worth	do.
Road Improvements	Dynas Powis Highway Board	E. Raymond Lewis	do.
Twenty-four Houses, Ferry-hill	N. E. Ry. Co.	Wm. Bell	Aug. 5
Masonry Clock Turret at Town Hall	Yeovil Corporation	*Official*	Aug. 8
*Granite and Gravel	Hendon U.R.S.A.	do.	Aug. 10
*Painting, &c. Schools, Leytonstone	Bethnal Green Guar.	do.	do.
*Pipe Sewer	Hanwell L. B.	E. J. W. Herbert	do.
Hotel, Stables, &c. Barry, Glam.	.....	W. H. D. Caple	do.
New Schools, Brickkiln-lane, Foleshill, Coventry	Foleshill School Board	T. F. Tickner	do.
Two Branch Banks, and Residences, Helston and St Columb	The Cornish Bank, Lim.	Silvanus Trevail	Aug. 11
*Battery and Drill Shed, Brightlingsea	Admiralty	*Official*	do.
*Brick and Pipe Sewers Works	Newport (I. of W.) C.	B. Latham	Aug. 17
Alteration of Premises and Erection of Shops, Warwick-street, &c. Leeds	Wm. Borras	Thos. Winn	No date
Six Houses, Beeston-hill, Leeds	.....	T. E. Farmery	do.
Church, Millfield, Sunderland	.....	Hicks & Charlewood	do.
*Painting Works, Devonport	War Department	*Official*	do.
Excavatingg and Brickwork, Hanley, Staffs	Johnson Bros.	.....	do
Extension of Workhouse	Newcastle under-Lyne Guardians	John Blood	do.
New Schools, &c. Treeton, Sheffield	.....	E. Winder, Jun.	do.
Alterations and Repairs to Church, Killinchy, Ireland	.....	A. H. De Wind	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary	Applications to be in
*Building Inspector and General Assistant	Hove Commissioners	2*l.* 2*s.* per week	July 27
*Surveyor and Inspector of Nuisances	Corp. of Beverley	150*l.*	July 29
*Road Inspector, &c.	Borough of Ipswich	2*l.* to 2*l.* 5*s.*	Aug. 3
*Surveyor and Chief Sanitary Officer	Corp. of Chelmsford	230*l.*	Aug. 8
*Clerk of Works	Willesden Burial Bd.	3*l.* 3*s.*	do.
*Sanitary Inspector, &c.	Boro of Bridgwater	200*l.* to 250*l.*	Aug. 10
*Junior Examiner	H. M. Works	.....	Sept. 3

Those marked with an Asterisk (*) are advertised in this Number. *Competitions, p.* iv. *Contracts, pp.* iv., vi., *and* viii. *Public Appointments, p.* xx.

RECENT PATENTS:

ABSTRACTS OF SPECIFICATIONS.

9,133.—BALL-COCKS, &c.: *D. Mackenzie.*—The ball-cock which is the subject of this patent is actuated directly from the ball without the intervention of levers. The ball is mounted on a suitable spindle provided with an indiarubber, metal, or other valve. This spindle works vertically in a valve casing fitted with a seating for valve, and inlet and outlet for water connected with water supply. To adjust the ball, removable weights are used. The syphon is attached to the cylinder which is fitted with an outlet or discharge opening to basin or pan of closet and with a piston which, when in its normal position, is on the syphon or upper side of the discharge-pipe to basin. By pulling the handle or similar means this piston is caused to move a sufficient distance to exhaust the air from the syphon and charge it, and, passing the outlet opening to basin, admits the whole contents of the cistern to the flush.

12,640.—MOSAIC DECORATIONS: *F. F. von Ainbach (Austria).*—According to this specification polychrome decorations are produced by laying variously-coloured cements upon surfaces of natural or artificial stone or tiles, previously prepared by rough-facing, engraving, or moulding, damping and subjecting the newly-finished slab to pressure, or by separately modelling metallic cement, or several modifications of the treatment of the stone or clays.

13,218.—VENTILATING: *E. Greenwood.*—According to this specification an adjustable ventilator is arranged to fit securely between the sash and frame of a window, constructed with perforations conducting the air from a lateral to a vertical direction.

14,290.—WALL VENTILATORS: *W. Morrison.*—The outlet wall-ventilator, which is the subject of this patent, consists of an oblong cylinder for receiving obnoxious vapours, and a circulating suction drum for the exit of the same. Gas or oil jets assist the power of suction, and special arrangements are made for preventing the admission of wind.

18,930.—VENTILATING APPARATUS: *R. Gregory and H. Harris.*—This invention consists in a ventilating air-pipe and cowl, in which are arranged at intervals openings of bell-mouth form, so as to induce and regulate air currents in the desired direction. The cowl works on a pivot or centre, and the lap-joint being sealed in water effectually prevents all down draught.

20,178.—PORTABLE-STAGE, SCAFFOLD, &c.: *G. J. Farrow.*—The stage which is described in this specification may be readily erected and taken apart, and packed in a small compass. It is made of iron pipe standards with bosses or enlargements thereon to receive the cross-pieces which are keyed for safety.

665.—SANITARY-PIPES: *W. Deening.*—The sanitary pipes which are the subject of this patent, are made with a joint and with a recess to receive a hard-setting cement.

NEW APPLICATIONS FOR PATENTS.

July 6.—11,432, R. Holden and W. Maine, Door Hatches.—11,440, R. and F. Hall, Tiled Hearth and Fender.—11,441, J. Anderson, Ventilating of Buildings, &c.—11,450, C. Darrah, Enquiry or Communication Windows.—11,471, A. Maynard, Machinery for Making Bricks and Tiles.

July 7.—11,509.—J. Bilton, Decorating Pottery.—11,524, C. Day, Fireproof Buildings, &c.—11,537, B. White, Brick-making Machines.—11,543, L. Tomalin, Water-closets.—11,546, J. Millard, Preventing Steam or Moisture on the inside of Shop or other Windows.—11,548, M. Meckel and C. Trenpel, Scaffold Holder.

July 8.—11,557, F. Pugh, Oilcloth as an improved substitute for wall-paper, ceilings, panels, and other decorative purposes.—11,585, G. Brindley, Siphon Cisterns and Water Waste-Preventers.—11,603, G. Parkinson, Automatic Window-sash Bolt.—11,613, F. Treharne and W. Eastwood, White Lead.—11,617, T. Severn, Kilns for Pottery, &c.—11,618, T. Lodge, Manufacture of Portland Cement.—11,635, J. Stephens, Door Bolts. Sash-fasteners, &c.

July 9.—11,648, J. Mills, Combined Corrugated Roofing and Spouting, and Combined Corrugated Roofing and Ridge Cap.—11,671, W. Oswald and J. Henshelwood, Ventilators.

July 10.—11,719, T. Duncan, Saw Sharpening.—11,729, G. Hatton, Knobs on Handles for Door-latches.—11,742, J. Green, French Roofing Tiles.—11,768, W. Pattenden and A. Rindesland, Window Sashes and Frames.

July 11.—11,785, W. Martin, Ventilator.—11,812, R. Dawe, Facilitating the opening, closing, fastening, and securing doors and gates.—11,821, T. Shaw, Sash-fasteners.

PROVISIONAL SPECIFICATIONS ACCEPTED.

9,360, R. Ewing, Earthenware Sewer-pipe Joints.—9,839, J. Sutcliffe, Sash-fastener.—9,847, M. Norman, Sash-fasteners.—9,882, G. Guynemer, Gate-hatches.—9,892, S. Gratrix, jun., & Bros., Ltd., and Henry Brocklesby, Flushing Cisterns.—10,057, W. Stock, Siphon Flushing Cisterns and Water Waste-preventers.—10,065, C. Priestley, Sash-fasteners.—10 231, J. Warman and F. Collyer, Sash-fasteners.—10,233, F. Robinson, Sash-fasteners.—10,464, W. Bowen, Sash-fasteners.—10,466, A. Sweetnam and J. Winkworth, Wash-out Water-closet Apparatus.—10,474, H Evans, New or Improved Means for Securing Window-sashes.—10,602, E. Culver, Sash-fasteners.—10,604, W. Ford, Sash-fasteners.—10,646, J. Gregory, Fastenings for Doors, &c.—10,701, J. Smith, Block for Flap-trap used in Sewers and Drains.—10,719, W. Knight, Sash-fasteners.—10,721, W. Downe, Sash-fasteners.—10,767, J. Dent, Tiles for Use in Building or Constructing Concrete Walls.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to Opposition for Two Months.

14,139, J. Taylor and others, Fireplaces or Grates. &c.—6,875, M. Logan, Drain for Stable Stalls.—8,140, A. Boult, Carving Machines.—9,733, W. Vance, Shutters for Firegrates.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

JULY 8.—By *Farebrother, Ellis, & Co.*: Three plots of f. land, Ross-rd., Wallington, 125*l.*—By *J. Lees & Burchell*: Two plots of f. land, Nutfield, Surrey, 124*l.*

JULY 9.—By *Debenham, Tewson, & Co.*: 31 and 32, Stoke-rd., Guildford, f., r. 63*l.*, 1,035*l.*; 43 and 44, Woodbridge-rd., f., r. 116*l.*, 1,740*l.*; 38 and 39, North-st., and 1 to 5, Silvester-sq., f., r. 62*l.* 2*s.* 8*d.*, 1,150*l.*

JULY 11.—By *D. J. Chattell*: "Shelton Farm," near Bedford, and 13a. 0r. 3p., f., 470*l.*; enclosures of arable land, 20a. 1r. 14p., 450.; enclosures of pasture land, 33a. 3r. 21p., 1,005*l.*

JULY 13.—By *Harman Bros.*: 35, Horsford-rd., Brixton, f., r. 40*l.*, 590*l.*; 73, Brayston-rd., Stoke Newington, u.t. 85 yrs., g.r. 6*l.*, r. 32*l.*, 309*l.*; 37, Heathfield-rd, u.t. 84 yrs., g.r. 9*l.*, r. 40*l.*, 400*l.*; 57, Nightingale-rd., Clapton, f., r. 34*l.*, 380*l.*—By *L. Farmer*: 29, Lichfield-rd., Cricklewood, u.t. 86 yrs., g.r. 6*l.* 6*s.*, 370*l.*—By *Geo. Gouldsmith, Son, & Co.*: 1, 5, and 7, South Eaton-pl., Belgravia, u.t. 23 yrs., g.r. 30*l.* r. 547*l.* 10*s.*, 4,970*l.*; 9, 11, and 13, South Eaton-pl., u.t. 23 yrs., g.r. 30*l.*, r. 530*l*, 4,700*l.*; 1, 2, and 3, Eaton-mews West, u.t. 23 yrs., g.r. 20*l.*, r. 770*l.*, 4,710*l.*; 8, 9, and 10, Sydney-pl., u.t. 39 yrs., g.r. 15*l.*, r. 295*l.*, 3,710*l.*; 3 and 12, Sydney-pl., u.t. 39 yrs, g.r. 10*l.*, 2,740*l.*; 4 and 18, Onslow-sq., u.t. 39 yrs., g.r. 15*l.*, r. 375*l.*, 4 130*l.*; 1, 2, and 3, Onslow-houses, u.t. 39 yrs., g.r. 15*l.*, r. 465*l.*, 5,410*l.*—By *A. Richards*: F.g.r. of 25*l.*, Broad-lane, Tottenham, with reversion in 78 yrs., 580*l.*; f.g.r. 23*l.*, Antill-rd., with reversion in 78 yrs., 530*l.*; f.g.r. of 91*l.* 10*s.*, Montagu-rd., with reversion in 78 yrs., 2,120*l.*; f.g.r. of 85*l.* 10*s.*, Antill-rd., with reversion in 78 yrs., 1,970; f.g.r. of 36*l.*, Springfield-rd., with reversion in 78 yrs., 825*l.*; f.g.r. of 14*l.* 6*s.*, Spencer-villas, with reversion in 78 yrs., 320*l*; f.g.r. of 78*l.*, Antill-rd., with reversion in 78 yrs., 1,780*l.*; f.g.r. of 49*l.* 10*l.*, Cunningham-rd., with reversion in 78 yrs., 1,120*l.*; 68 and 70, Mare-st., Hackney, f., 500*l.*—By *W. H. Collier*: A plot of f. land, Hornshay-st., Deptford, 85*l.*; a plot of f. land, Upcot-st., 560*l.*; a plot of f. land, Knoyle-st., let at 94*l.* 10*s.*, 1,850*l*; a plot of f. land, Nynehead-st., 1,000*l.*; f.g.r. of 20*l.*, Hunsdon-rd., with reversion in 72 yrs., 500*l.*; f.g.r. of 23*l.* 15*s.*, Blockhouse-st., with reversion in 70 yrs., 575*l.*; f.g.r. of 9*l.*, Upcot-st., with reversion in 70 yrs., 220*l.*; f g r. of 26*l.* 15*s.*, Lovelinch-st., with reversion in 70 yrs., 650*l.*; f.g.r. of 26*l.*, Woodpecker-rd., with reversion in 72 yrs., 625*l.*; f.g.r. of 3*l.* 10*s.*, Chipley-st., with reversion in 69 yrs., 100*l.*; f.g.r. of 10*l.*, Knoyle-st, with reversion in 70 yrs., 240*l.*

JULY 14.—By *F. W. Glazier*: 37, Radcliffe-gdns., Kensington, u.t. 71 yrs., g.r. 30*l.*, 1,400*l.*; 5a, Richmond-mews, Paddington, u.t. 61 yrs., g.r. 6*l.*, 130*l.*—By *W. N. Willoughby*: "Boeboetan," Lancaster-road, Norwood, u.t. 92 yrs., g.r. 20*l.*, 1,100*l.*—By *Towers, Ellis, & Co.*: 72 and 74, Gloucester-cres., Hyde-park, u.t. 57 yrs, g.r. 14*l.*, 1,870*l.*—By *Nightingale, Phillips, & Page*: Residence, "Somerleyton," Hampton Wick, u.t. 90 yrs., g.r. 7*l.* 7*s.*, 280*l.*—By *Driver & Co.*: 8, Suffolk st., Pall Mall, u.t. 28¾ yrs., g.r. 58*l.* 10*s.*, r. 175*l.*, 1,400*l.*; 13, 14, and 15, Pall Mall, area 3,770 ft., 80 yrs. lease, let at 1,525*l.* a year.—By *Debenham, Tewson, & Co.*: 44 and 45, Milton-st, City of London, u.t. 62 yrs, g.r. 140*l.*, r. 450*l.*, 4,100*l.*; "Belclare," Ashburton-rd., Addiscombe, u.t. 88 yrs., g.r. 10*l.*, r. 55*l.*, 550*l*; 168, Lower Addiscombe-rd., u.t. 88 yrs., g.r. 15*l.*, r. 80*l.*, 650*l.*; Residence, "Chinthurst," Shalford, Surrey, and 7a. 1r. 7p., f., 4,200*l.*—By *Furber, Price, & Furber*: 4, Lowther-rd., Holloway, u.t. 43 yrs., g r. 6*l.*, r. 38*l.*, 350*l.*; 22 and 23, Charles-st., and 13, Bleeding Hart-yd., Hatton-garden, u.t. 21 yrs., g.r. 50*l.*, r. 215*l.* 10*s.*, 300*l.*; f.g.r. of 11*l.*, Dunlace-rd., Clapton, with reversion in 75 yrs., 255*l.*; 2, 4, and 6, Dunlace-rd., u.t. 75 yrs., g.r. 16*l.* 10*s.*, r. 90*l.*, 800*l.*; 1 and 2, Eliza cottages, f., r. 55*l.*, 650*l.*

JULY 15.—By *A. J. Sutherland*: F.g.r. of 12*l.*, St. Ann's-rd., Wandsworth, with reversion in 63 yrs., 265*l.*; f.g.r. of 17*l.*, Park-rd., with reversion in 70 yrs., 505*l.*; f.g.r. of 8*l.*, with reversion in 65 yrs., 200*l*—By *J. A. Smith*: 16, Rowan-rd., Hammersmith, u.t. 57 yrs., g.r. 3*l.* 3*s.*, r. 28*l.*, 280*l.*—By *A. Watson*: "Stacie's Farm," near Manningtree, and 312a. 3r. 36p., f., r. 515*l.*, 5,500*l.*—By *Rushworth & Stevens*: 24 and 26, Byrne-rd., Balham, u.t. 83 yrs., g r. 15*l.*, r. 58*l.*, 360*l.*—By *Mullett, Bocker, & Co.*: Nos. 94 and 96, Edgware-rd., and 20, Bird's-mews, u.t. 12¾ yrs., g.r. 10*l.* 10*s.*, r. 186*l.*, 2,170*l.*

By *Chadwick & Sons:* 10, Allington-st., Pimlico., u.t. 30 yrs., g.r. *nil*, r. 30*l.*, 420*l.*; 6, 7, and 8, Bridport-st., Blandford-square, u.t., 50 yrs., g.r. 18*l.*, r. 171*l.* 4s., 1,345*l.*—By *W. & F. Houghton:* F.g.r. of 28*l.*, Chingford, with reversion in 26 yrs., 2,000*l.*: 10, Cock-lane, Holborn, f., 620*l.*; "The Victory" Beer House, Walthamstow, f., r. 30*l.*, 1,000*l.*; eight f. cottages, Chapel-end, Walthamstow, r. 81*l.* 18s., 610*l.*; six f. cottages, Waggon and Horses-lane, Tottenham, 350*l.*; "The Old Poplars," f., Hyde Side, Edmonton, 770*l.*; four f. plots of land, Fairfield-rd., 210*l.*; 1 to 6, Courtney-pl., Walthamstow, u.t., 86 yrs., g.r. 24*l.*, r. 124*l.* 16s., 530*l.*

JULY 16.—By *W. J. Newell:* 9 and 11, Webster-rd., Bermondsey, u.t. 55 yrs., g.r. 9*l.* 10s., r. 58*l.*, 580*l.*—By *E. Stimson:* 43, St. Stephen's-ter., Clapham, and improved rental of 88*l.*, u.t. 72 yrs., 1,325*l.*; 32 and 33, Esher-st., Kennington-lane, c., r. 56*l.*, 450*l.*; 42 and 44, Gowlett-rd., Peckham, u.t. 77 yrs., g.r. 14*l.*, r. 56*l.*, 400*l.*; 26, Keston-rd., u.t. 77 yrs., g.r. 7*l.*, r. 28*l.*, 200*l.*; 1 and 2, Rose-cottages, Norwood, f., r. 45*l.*, 500*l.*; 99 to 111 (odd), Union-rd., Newington-causeway, and a l g.r. of 6*l.*, u.t. 16 yrs., g.r. 27*l.* 5s., 1,250*l.*—By *Walton & Lee:* Residence and 2 a., Chiddingfold, Surrey, 1,800*l.*—By *Newbon & Co.*: 2, Down's-rd., Clapton, f., 580*l.*; 12, St. Mary's-rd., Canonbury, u.t. 54 yrs., g.r. 8*l.*, 500*l.*; 444, Seven Sisters-rd., Finsbury-park, u.t. 74 yrs., g.r. 14*l.*, 700*l*; 9, Mildmay-park, Islington, f., r. 47*l.* 10s., 510*l.*; 15, Roseleigh-avenue, Highbury, u.t. 88 yrs., no g.r., 550*l.*; 3, Grazebrook-rd., Stoke Newington, u.t. 72 yrs., g.r. 1*l.*, 440*l.*; 10 and 14, St. Ann's-ter., Stamford-hill, u.t. 83 yrs., g.r. 13*l.*, r. 62*l.*, 290*l.*; 103, Moray-rd., Holloway, u.t. 73 yrs., g.r. 6*l.* 6s., r. 30*l.*, 250*l.*; 27 and 29, Oriel-rd, Homerton, u.t. 71 yrs., g.r. 3*l.* 10s., 425*l.*—By *T. G. Wharton*: 28 to 34 even, Glengarry-rd, Champion-hill, u.t. 89 yrs., g.r. 28*l.*, 935*l.*; 18 to 24, Trossachs-rd., u.t. 89 yrs., g.r. 29*l.* 8s., r. 120*l.*, 920*l.*; 1, Lorn-villas, Teddington, u.t. 90 yrs., g.r. 9*l.*, 95*l.*; 9 to 12, Mansfield-ter., Walthamstow, u.t. 88 yrs., g.r. 20*l.*, 395*l.*; 24, Park-grove, West Ham, u.t. 80 yrs., g.r. 5*l.*, 95*l.*; 3 and 4, Laurel-cottages, Tottenham, u.t. 74 yrs., g.r. 9*l.*, 125*l.*; 63, Lillie-rd., West Brompton, u.t. 63 yrs., g.r. 12*l.* 10s., r. 60*l.*, 385*l.* By *H. J. Bliss & Sons*: 5 to 11 (odd), Mare-st., Hackney, u.t. 96 yrs., g r. 130*l.*, 1,500*l.*; 220 to 226 (even), Ferndale-road, Brixton, u.t. 98 yrs., g r. 20*l.*, r. 120*l.*, 1,130*l.*; 32, 34, 45 to 67 (odd), Marlow-rd., Homerton, f., r. 231*l.* 8s., 1,745*l.*; five plots of f. land, Wilbeam-rd., Harold Wood, 30*l.* By *J. R. Kemp & Co* : f.g.r. of 25*l.*, Addison-rd., Kensington, with reversion in 60 yrs., 775*l.*; f.g.r. of 8*l.*, Capland-street, Lisson-grove, with reversion in 66 yrs., 165*l.*; 8, Brushfield-st., Bishopsgate-st., f., r. 80*l.*, 1,690*l.*; 6, Torrington-pl., Russell-square, u.t. 32 yrs., g.r. 10*l.*, r. 165*l.*, 1,910*l.*

JULY 17.—By *Hooker & Webb*: 2, Gillingham-st., Pimlico, u.t. 33 yrs., g.r. 8*l.* 8s., r. 60*l.*, 600*l.*; 2 and 4, Lingham-st., Stockwell, u.t. 95 yrs., g.r. 16*l.*, 500*l.*—By *F. J. Bisley*: F. residence, "Ashdeene," Catford, and 1a. 1r. 36p., 1,450*l.*; 56, Frean-st., Bermondsey, u.t. 25 yrs., g.r. 3*l.*, r. 28*l.* 12s., 135*l.*—By *E. Evans*: 9, Edward-st., Lambeth, u.t. 20 yrs., g.r. 7*l.*, r. 42*l.* 18s., 130*l.*; 52 and 53, Warrior-rd., Camberwell, u.t. 54 yrs., g.r. 8*l.*, r. 62*l.* 8s., 360*l.*; 22 and 22a, Lothian-rd., f., r. 67*l.* 12s., 520*l.*; 85, Rye-lane, Peckham, u.t. 67 yrs., g.r. 11*l.* 11s., 430*l.*; 10, Philip-rd., u. t. 63 yrs., g.r. 5*l.*, 240*l.*

[*Contractions used in these lists,*—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard, &c.]

PRICES CURRENT OF MATERIALS.

TIMBER.		
Greenheart, B.G. ton	8/0/0	9/0/0
Teak, E.I... load	8/0/0	14/0/0
Sequoia, U.S.ft.cu.	2/3	3/0
Ash, Canada load	2/5/0	4/0/0
Birch, do.	2/5/0	4/5/0
Elm, do.	3/5/0	4/15/0
Fir, Dantsic, &c.	2/0/0	3/10/0
Oak, do.	2/10/0	4/10/0
Canada.....	4/17/6	6/10/0
Pine, Canada red	2/10/0	3/10/0
Do, yellow	2/0/0	5/0/0
Lath, D'ntsic, fath	5/0/0	6/0/0
St. Petersburg	5/0/0	7/0/0
Deals, Finland, 2nd & 1st std 100	7/15/0	10/0/0
Do, 4th & 3rd..	7/5/0	8/5/0
Do. Riga	6/5/0	7/15/0
St. Petersburg, 1st yellow ..	9/15/0	14/0/0
Do. 2nd yellow	8/5/0	9/5/0
Do. white	8/15/0	10/0/0
Swedish	6/15/0	15/10/0
White Sea	8/5/0	17/0/0
Canada, Pine 1st	12/10/0	24/0/0
Do. do. 2nd....	9/0/0	15/10/0
Do. do. 3rd, &c.	6/10/0	10/0/0
Do. Spruce. 1st	8/0/0	10/10/0
Do. do. 3rd & 2nd.....	6/0/0	7/10/0
New Brunswick	5/5/0	7/5/0
Battens, all kinds	3/10/0	15/10/0
Flooring Boards, sq., 1 in. prep. 1st	0/10/0	0/13/6
Do. 2nd.....	0/9/0	0/10/6
Other qualities	0/4/6	0/7/6
Cedar, Cuba ..ft.	/4	/4½
Honduras, &c.	/4	/4½
Mahogany, Cuba.	/4½	/6½
St. Domingo, cargo av	/4½	/6½
Mexican do. do	/4½	/5
Tobasco do. do	/5½	/7
Honduras do..	/5½	/6½
Box, Turkey ton	4/0/0	13/0/0
Rose, Rio.....	10/0/0	20/0/0
Bahia	9/0/0	18/0/0

TIMBER (*continued*).		
Satin, St. Domingo .....ft.	0/0/10	0/1/3
Porto Rico	0/0/10	0/1/6
Walnut, Italian..	0/0/3½	0/0/7
METALS.		
IRON—Bar, Welsh, in London..ton	6/5/0	6/15/0
Do. do. at works in Wales	5/15/0	6/5/0
Do. Staffordshire, in London	6/5/0	7/0/0
COPPER—British, cake and ingot	58/10/0	59/0/0
Best selected ..	59/10/0	60/10/0
Sheets, strong..	68/0/0	0/0/0
Chili, bars	52/12/6	53/10/0
YELLOW METAL lb.	0/0/6	0/0/6½
LEAD—Pig, Spanish....ton	12/7/6	12/10/0
English, com. brands	12/8/9	12/11/3
Sheet, English, 3 lbs. per sq. ft. and upwards ..	14/10/0	0/0/0
Pipe	15/0/0	0/0/0
ZINC—English sheet .....ton	27/0/0	0/0/0
Vieille Montagne.....	27/10/0	0/0/0
TIN—Straits	91/2/6	91/12/6
Australian	91/0/0	91/10/0
English Ingots	94/10/0	0/0/0
OILS.		
Linseed .....ton	21/0/0	21/2/6
Cocoanut, Cochin	31/0/0	0/0/0
Do. Ceylon	27/0/0	0/0/0
Palm, Lagos	24/10/0	25/0/0
Rapeseed, English pale	30/0/0	30/5/0
Do. brown	28/15/0	0/0/0
Cottonseed ref...	20/15/0	0/0/0
Oleine .... ref...	21/15/0	24/0/0
Lubricating, U.S.	5/0/0	6/0/0
Do. refined	8/0/0	12/0/0
TAR—Stockholm barrel	1/0/0	1/0/6
Archangel	0/13/6	0/14/0

TENDERS.

[Communications for insertion under this heading must reach us *not later than* 12 *noon on Thursdays.*]

BELLAGGIO (Surrey).—For alterations and additions to bungalow at Furzefield Chase, Bellaggio, Surrey, for Mr. W. Stopher. Mr. Walter J. Ebbetts, architect, 115, Strand, W.C.:—
Head Bros. £830 0 0

BRIDGWATER.—For new sewer, manholes, &c., at St. Saviour's, for the Corporation of Bridgwater. Mr. G. B. Laffan, Borough Surveyor:—

Williams & Bennett..	£277 6 0	Harris & Tapscott,	
Wm. Hellard	269 10 0	Bridgwater	£261 0 0

* Accepted.

BRISTOL.—For erecting Homes for Aged Poor, Bristol. Mr. F. W. Tasker, architect, London:—

P. Blowey	£2,670 0	Stephens, Bastow, & Co.	£2,499 0
H. H. Forse	2,539 10	J. R. Lewis	2,438 0
W. Brock & Son.....	2,520 0		

BRISTOL.—For new print loft and store at Temple-gate, Bristol, for Messrs. J. Hare & Co.:—
A. J. Beaven (accepted) £1,770 0 0
[Lowest of three invited tenders.]

BRISTOL.—For the extension of Horfield Church, Bristol. Messrs. Crisp & Oatley, architects, Bristol:—

Veals	£2,200	Stephens, Bastow, & Co. ..	£1,998
Galbraith	2,138	Humphreys	1,998
J. E. Davies	2,100	E. Walters.....	1,950
G. Turner	2,095	Cowlin & Son	1,934

BRISTOL.—For Conservative hall and club at Bedminster, Bristol. Mr. W. V. Gough, architect, Bristol:—

G. Humphreys	£3,964	W. Church	£3,794
E. T. Hatherley	3,950	Cowlin & Son	3,745
Eastabrook & Sons.....	3,946	A. J. Beaven*	3,690
Brock & Sons	3,900		

* Accepted.

Plumbers' Work.

E. Woodward	£337 0 0	G. F. Tuckey	£251 15 0
J. Holbrook.....	291 10 0	[All of Bristol.]	

BRISTOL.—For warehouse, offices, &c., at Canon's Marsh, Bristol, for Messrs. Cripps & Co., Limited. Mr. F. W. Wills, architect, Bristol:—

Eastabrook & Sons	£3,723	J. Durnford & Son.....	£3,340
W. Brock & Sons.....	3,634	W. Cowlin & Son.....	3,135
W. Church	3,544	A. J. Beaven*	3,130
E. T. Hatherley	3,449		

* Accepted.

CARDIFF.—For the erection of new Waterworks Depot, Penarth-road, for the Cardiff Corporation. Mr. J. A. B. Williams, Engineer. Quantities by Messrs. Veall & Sant, Cardiff:—
D. J. Davies, Cardiff (accepted) £2,799 0 0

CARDIFF.—For Higher Grade School extensions, Cardiff. Messrs. Seward & Thomas, architects, Queen's Chambers, Cardiff:—

L. Parnell	£14,100	J. Hopkins	£12,700
Shepton & Co.....	13,785	W. Symonds	12,572
D. J. Davies	13,750	T. Gough	12,474
W. Thomas.....	13,540	Turner & Sons	12,078
W. Bowers	12,793	C. C. Dunn	11,975
D. Davies	12,740	Burton & Co.....	11,957

Amended Tenders.

T. Gough.....	10,256 1 8	C. C. Dunn*	9,877 11 4
Turner & Sons	10,169 0 0	Burton & Co.....	10,131 0 0
[All of Cardiff.]		* Accepted.	

CRICKLEWOOD.—For the erection of dry-plate works for The Standard Photo Company. Mr. W. Gillbee Scott, architect, 25, Bedford-row, W.C.:—
Johns & Smith (accepted) £1,349 0 0

GRAYS (Essex).—For the completion of Arthur-street Schools, for the Gray's Thurrock School Board. Mr. Geo. Waymouth, architect, 23, Moorgate-street, E.C.:—

J. Pavitt	£2,134	R. H. Rons	£1,800
E. Houghton.....	1,924	S. Grist, Aylesbury*.....	1,638
H. J. Carter	1,900		

* Accepted.

HANLEY.—For addition to works, Eastwood, Hanley, for Mr. E. Cotton. Messrs. R. Scrivener & Sons, architects, Hanley:—

J. Breeze	£580	N. Bennett, Burslem*.....	£485
T. Godwin	503	A. Hall	465

* Accepted.

HORBURY (near Wakefield). — For widening Westfield-road, Horbury, for the Horbury Local Board. Mr. H. P. Dawson, Surveyor, Local Board Office, Horbury, near Wakefield, Yorks:—

James Hemingway.	£3,075 0 0	Joseph Speight	£2,877 17 6
Slinger & Naylor ..	3,070 0 0	J. & G. Wilson	2,862 6 3
Enos Hindle	3,045 10 0	John Pickersgill ..	2,760 0 0
James Dews	2,987 4 6	Wm. Godley	2,670 0 0
Geo. Walker	2,917 16 9½	J. & J. Aliffe, Ossett,	
Samuel Ross	2,900 0 0	Yorks (accepted)..	2,341 5 0

Surveyor's estimate, £2,800.

HORNSEY. — For alterations and additions to the Crouch End Schools, for the Hornsey School Board. Mr. T. Chatfeild Clarke, architect. Quantities by Messrs. Leonard & Clarke:—

Woodward	£1,540	J. Smith & Son	£1,259
Kilbey & Gayford	1,495	McCormick	1,242
Scrivener & Co.....	1,451	Houghton & Son	1,169
Lawrence & Son	1,431	B. E. Nightingale	1,116
Mattock Bros.	1,423	Ashby Bros.	1,083

LITTLE ILFORD (Essex.)—For the erection and completion of infants' school at Little Ilford, for the Little Ilford School Board. Mr. R. L. Curtis, architect, London-wall, E.C. Quantities supplied:—

Cooper	£2,846 0 0	Watson	£2,680 0 0
Gregar	2,792 0 0	H. Knight & Son....	2,648 0 0
Calnan	2,742 19 3	Kellett	2,640 0 0
Stimson.....	2,724 0 0	W. Brass.....	2,635 0 0
Reed	2,696 0 0	J. Morter	2,539 0 0

LONDON.—For sundry alterations, decoration, &c., to Archway Wesleyan Chapel, Highgate. Mr. Elijah Hoole, architect, 16, Finsbury-circus, E.C.:—

Williams	£628	McFarlane	£544
E. Houghton & Son	573	Kerry (accepted).....	517

LONDON.—For the erection of four houses, Coborn-road, Mile End. Messrs. Hammack & Lambert, architects:—
F. & F. J. Wood £1,897
[No competition.]

LONDON.—For the erection of a Junior Mixed Department to provide accommodation for 288 children, and also a cookery centre, in Mantua-street, Battersea, for the School Board for London. Mr. T. J. Bailey, Architect:—

		Add for tar-pavement, &c.
Foster & Dicksee	£6,467	£451
Lathey Bros.....	6,367	552
J. W. Hobbs & Co., Limited	6,032	500
W. H. Lorden & Son	5,987	519
Hart Bros.....	5,944	508
J. T. Chappell	5,762	480
Holloway Bros.	5,631	463
J. Tyerman, 220, Walworth-road*	5,601	485

* Recommended by the Works Committee for acceptance.

LONDON.—For the supply of a new boiler for the heating apparatus at the Everington-street School, Hammersmith, for the School Board for London. Mr. T. J. Bailey, Architect:—

Rosser & Russell	£205 0 0
Conyn Ching & Co.....	198 0 0
C. P. Kinnell & Co., Southwark-street*	176 10 0

* Recommended by the Works Committee for acceptance.

LONDON.—For alterations and repairs at the City of London Schools, Victoria Embankment, E.C., for the Corporation of the City of London. Mr. A. Murray, architect. Quantities by Messrs. Franklin & Andrews:—

Gentry.....	£3,686	Lang	£2,725
B. E. Nightingale	3,505	Mowlem	2,713
Philps & Bisiker	3,339	Lark	2,580
Lamble	3,276	Holliday & Greenwood ..	2,535
Lidstone	3,145	Harrison & Spooner	2,487
Chappell.....	2,829		

LONDON.—For re-instating upper story and roof at No. 62, Gray's-inn-road, for Mr. F. Sage. Mr. W. Graves, architect:—

B. E. Nightingale	£362	Lawrence & Sons	£321
Bowyer	358	Pitman & Son	312

LONDON.—For alterations and additions to Dowgate Wharf, for Mr. C. Poulter. Mr. E. A. Crockett, architect:—

Greenwood	£1,999	Ashby & Horner.....	£1,884
B. E. Nightingale	1,899	Outhwaite	1,820

LONDON.—For repairs, &c., to 177 and 179, Lordship-lane, Dulwich, S.E. Messrs. Walker & Runty, architects:—

Barrett & Power	£688 0	Hughes	£589 6
B. E. Nightingale.....	594 0		

LONDON.—For painting, &c., to the Central Poultry and Provision Market, Smithfield, for the Corporation of the City of London. Mr. A. Murray, architect:—

Anderson.....	£8,730 !	B. E. Nightingale	£4,576
Heeps	5,460	Taylor	4,387
Lister	4,970	McCormuck	4,342
Mason	4,944	Wilmot	3,392 !
Harrison & Spooner.....	4,647		

LONDON.—For additions to stables, Spitalfields, for the Great Eastern Railway Company. Mr. John Wilson, Engineer:—
J. O. Richardson, Albert Works, Peckham (accepted) £6,911 14 0

LONDON.—For re-building No. 7, Fenchurch-street, E.C., for Mr. C. J. Knowles. Mr. E. B. Ellis, architect. Quantities by Messrs. Campbell & Son:—

Greenwood	£11,340	Perry & Co.....	£10,977
Grover & Son	11,266	Ashby & Horner..	10,966
Chappel	11,164	B. E. Nightingale*	10,588
Colls & Sons	10,995		

* Accepted.

LONDON.—For erecting workshops, Wilmer-gardens, Kingsland-road, for Mr. Frederick Hicks. Mr. William C. Banks, architect, 39a, Gracechurch-street, E.C.:—

Hart Bros.	£753	Langham*.....	£694
Brittan	750		

* Accepted.

LONDON.—For proposed vicarage-house to be erected in Downstreet, Piccadilly, for the parish of Christ Church, Mayfair:—

Holloway	£3,676 0	Nye	£3,486 0
Wetherill, Lee, &		Dovey	3,347 0
Martin	3,572 10	Charteris	3,140 0

LONDON.—For repairs and decorations to No. 24, Longridge-road, South Kensington, for Mr. T. Rouse Ebbetts, Mr. Walter J. Ebbetts, architect, 115, Strand, W.C.:—
W. Steel (accepted) £280 0 0

LONDON.—For making-up and paving Gledstanes-road, Fulham, for the Vestry of the parish of Fulham. Mr. W. Sykes, New Streets Surveyor:—

	Roadway		York stone.		Victoria stone.		Imperial stone.	
Nowell & Robson..	£559	....	£141	....	..	....	..	..
Tomes & Wimpey..	519	....	141	....	£138	....	£132	
H. J. Greenham...	520	....	..	....	..	....	..	..
E. Rogers & Co....	493	....	156	....	131	....	134	
J. Mears.....	546	....	..	....	..	....	..	..
Victoria Stone Co.	..	....	..	....	120	....	..	..

LONDON.—For the erection of business premises in Denman-street, Railway-approach, London Bridge, S.E., for Mr. J. A. Fielden. Mr. J. W. Brooker, architect, 13, Railway-approach, London Bridge, S.E.:—

Castle	£7,502	Hart Bros.....	£7,045
Battley	7,464	W. Downs.....	7,017
Ashby & Horner	7,205	Burman & Son.....	6,680
Morter.....	7,193	Kick	6,648
Lawrance	7,170	Wm. Shepherd (accepted)	6,652

LONDON.—For alterations at the "Union" Tavern, Great Portland-street. Mr. R. A. Lewcock, architect, 88, Bishopsgate-street Within:—

Davies	£205 0	Lister	£185 10
Courtney & Fairbairn....	195 0	Clarke & Mannoch	179 0
Lundy	186 0	Saunders	160 0

LONDON.—For alterations at the "North London" Hotel, Brondesbury. Mr. R. A. Lewcock, architect, 88, Bishopsgate-street Within, E.C.:—

Voller	£935	Goodall.....	£820
Courtney & Fairbairn	915	Todd	797

LONDON.—For alterations at the "King's Head," Bow-road. Mr R. A. Lewcock, architect, 88, Bishopsgate-street Within:—

Edwards & Medway.....	£1,420	Walker Bros.	£1,293
Todd	1,347	Courtney & Fairbairn....	1,252

LONDON.—For alterations at the "Wheatsheaf" Tavern, Goldhawk-road, Shepherd's-bush. Mr. R. A. Lewcock, architect, 88, Bishopsgate-street Within:—

Voller	£2,645	Courtney & Fairbairn	£2,505
Todd.....	2,615	Spencer & Co.	2,320
Edwards & Medway	2,588	Davies	2,047

Pewtering and Counter.

Heath (accepted)	£244 0 0		

Gas-fittings.

Whin (accepted)	£209 0 0		

LONDON.—For alterations at the "Morpeth Castle" tavern, Cadogan-terrace, Victoria Park. Mr. R. A. Lewcock, architect, 88, Bishopsgate-street Within:—

Goodall	£865	Walker Bros.	£753
Todd	829	Edwards & Medway	717
Courtney & Fairbairn	803		

Pewtering.

Heath	£114	Thomson	£106

LONDON.—For alterations at "The George" tavern, Commercial-road, East. Mr. R. A. Lewcock, architect, 88, Bishopsgate-street Within:—
Spencer & Co. (accepted)..... £2,370 0 0

LONDON.—For pulling down and rebuilding the "Jolly Gardeners" tavern, Princes-road, Lambeth. Mr. R. A. Lewcock, architect, 88, Bishopsgate-street Within:—
F. Voller (accepted) £5,447 0 0

LONDON.—For erecting workmen's dwellings, Brighton-street and Wood-street, Cromer-street, Gray's-inn-road, for the East End Dwellings Company (Limited). Messrs. Davis & Emanuel, architects, 2, Finsbury-circus, E.C. Quantities supplied by Mr. F. Downing, 7A, Whitehall-yard, S.W.:—

F. & F. J. Wood	£16,038	Holliday & Greenwood ..	£14,777
Rider & Sons	15,972	Dove Bros.	14,259
Colls & Sons	15,886	Williams & Son	14,135
Woodward & Co.	15,759	Ashby Bros.	13,989
Harris & Wardrop.....	15,440	S. J. Jerrard (accepted)..	13,837

LONDON.—For baths and washhouses at Westminster. Mr. Fras. J. Smith, arthitect. Quantites supplied by Messrs. J. & A. E. Bull:—

Wilcock	£21,862	Nightingale.....	£20,414
Holloway Bros.	21,718	Brass & Son	19,893
Chappell	21,620	Jerrard	19,683
Kirk & Randall.....	21,548	Gould & Brand	19,436
Allen & Son	21,300	Charteris.....	19,140
Mowlem & Co.	21,293	Stimpson & Co.	18,800
McCormick.....	20,600	J. O. Richardson	18,510

LONDON.—For erecting new public library at Westminster. Mr. Francis J. Smith, architect. Quantities supplied by Messrs. J. & A. E. Bull:—

Holloway Bros.....	£8,750	McCormick	£7,600
Nightingale	8,569	Gould & Brand	7,464
Kirk & Randall	8,450	Jerrard	7,443
Chappell.....	8,395	Charteris	7,392
Wilcock	8,349	Stimpson & Co.....	7,350
Brass & Son	8,157	Allen & Son	7,250
Mowlem & Co.....	8,105	J. O. Richardson.....	6,858

LONDON.—For modernising the "Surrey Tavern," Wandsworth Common, for Mr. J. T. Bonner. Mr. Dear, architect, 117, Great Russell-street, Bloomsbury. Quantities by Mr. J. Leaning, 11, Poultry, E.C. :—

Burman & Sons	£1,170	Sharpe	£990
Gould & Brand	1,050	Lascelles	940
Drew & Cadman	1,030		

LONDON.—For alterations and repairs to the "Dover Castle" public-house, Cold Harbour-lane, Camberwell, for Mr. T. C. Dorling. Messrs. Saville & Martin, architects, 86 & 87, Strand :—

McLachlan	£1,674	Young & Longsdale	£1,471
T. R. Roberts	1,595	Dearing & Son	1,451
Chandler & Sons	1,500	W. Littlefield	1,378
Gould & Brand	1,486	J. McDonald & Son	1,257

LONDON.—For the erection of new Lunatic Wards, Lying-in Wards, and other buildings, and for carrying out various alterations and additions, to the Workhouse, Fulham Palace-road, Hammersmith, for the Guardians of the Fulham Union. Mr. H. Saxon Snell, architect, London :—

B. E. Nightingale	£28,539	Flew & Co.	£24,340
Thos. Nye	26,747	George Gibson	24,300
Scharien & Co.	26,470	Leslie & Co., Kensington-square (accepted)	23,980
J. & M. Patrick	26,150	W. J. Adcock (withdrawn)	22,477
A. Kellett	25,794		

LONDON.—For alterations and repairs to 12, Hamilton-terrace, St. John's-wood, for Mr. J. T. Ricketts :—

Sayer	£315	Williams	£282
Phillips	289	T. Watson, Dulwich*	220

* Accepted.

LONG REACH (Dartford). — For hot-water boiler, &c., at the Hospital Ships, for the Metropolitan Asylums Board. Messrs. A. & C. Harston, architects, 15, Leadenhall-street, E.C. :—

R. W. Moss	£462 0	C. P. Kinnell & Co.	£138 10
Clements, Jeakes, & Co.	270 0	J. & F. May	130 0
Rosser & Russell, Ltd.	180 10	Constructional Ironwork Co., Ltd., Dace-road, Bow, E. (accepted)	105 0
Wenham & Waters, Ltd.	180 0		
J. Fraser & Son	144 0		

NEWCASTLE-UNDER-LYME.—For alterations to Lloyd's Bank, Newcastle-under-Lyme. Messrs. R. Scrivener & Sons, architects, Hanley :—

H. & R. Inskip	£1,550	T. Godwin	£1,433
Rose Vale Brick and Tile Co.	1,493	G. Ellis, Hanley*	1,220
J. Gallimore	1,460	W. Cooke	1,200

* Accepted.

NORMACOT (Staffordshire). — For erecting three houses at Normacot, for Mr. T. W. Parker. Messrs. R. Scrivener & Sons, architects, Hanley :—

T. Minks	£1,975	Tomkinson & Betteley, Longton*	1,579
G. A. Barlow	1,800		
H. & R. Inskip	1,609		

* Accepted.

NORWICH.—For erecting new barley store, Norwich, for Messrs. Lacon & Co. Messrs. Bottle & Olley, architects, Great Yarmouth :—

J. Downing & Sons	£1,196	G. E. Hawes	£1,025
W. Cork	1,099	Youngs & Son	975
J. S. Smith	1,032	H. Lacey, Norwich*	935

* Accepted.

PONDER'S END.—For the erection of a fire-brigade station at Ponder's End, N., for the Enfield Local Board. Mr. W. Kitteringham, Surveyor :—

White	£583	Dearsley	£532
Field & Sons	555	Almond & Sons	480
Hy. Knight & Son	549	Newman (accepted)	430
A. Fairhead & Son	548		

SOUTHAMPTON. — For proposed shop and warehouse, for Mr. S. M. Silverman, Anglesea-place, Above Bar, Southampton. Mr. W. Burrough Hill, architect, Southampton :—

J. Crook & Sons	£2,287 10	E. Saudon	£2,096 0
C. B. Jordan	2,190 0	Stevens & Co.	1,892 0
H. J. Sanders	2,183 0	Morgan, Isted, & Morgan	1,886 0

SOUTHWOLD (Suffolk).—For erecting new bank, Southwold, Suffolk, for Messrs. Gurneys & Co. Messrs. Bottle & Olley, architects, Great Yarmouth :—

R. J. Allen, Southwold (accepted) £720 0 0

SHORTLANDS (Kent).—For erecting stable and coach-house at "The Vale," for Mr. H. J. Selby :—

T. Watson, Dulwich £275 0 0

[No competition.]

STOKE-ON-TRENT.—For erecting flint-mill at the Cliffe Vale Sanitary works, for Mr. T. W. Twyford. Messrs. R. Scrivener & Sons, Architects, Hanley :—

J. Gallimore	£3,100 0	G. Ellis	£2,851 10
Tomkinson & Betteley	3,000 0	N. Bennett, Burslem*	2,759 0
Inskip	2,994 0	J. T. Clarke	2,704 0
T. Godwin	2,900 0	G. C. Dunn	2,700 0
W. Cooke	2,871 0	G. A. Barlow	2,660 0

* Accepted.

Machinery.

Wm. Boulton	£4,284	Hartley, Arnox, & Fannings, Stoke-on-Trent*	£3,303
J. Silvester	3,670		
Woodhouse & Rawson	3,575		

* Accepted.

SWINDON.—For erecting Isolation Hospital, Gorse Hill, Swindon, Wilts, for the Swindon New Town Local Board. Mr. H. J. Hamp, Surveyor :—

J. Williams	£4,504	G. Wiltshire, Swindon*	£4,080
F. Recks	4,359		

* Accepted.

[Surveyor's estimate, £4,400.]

TILBURY (Essex).—For the erection of a school for 400 children, for the Chadwell St. Mary School Board. Mr. Horace T. Bonner, architect, 29 and 30, King-street, Cheapside :—

	Building.	Play-sheds.	Iron Fence.
Reed, Blight, & Co., Plymouth	£3,833 0 0	£110 0 0	£28 0 0
W. White, Grays	3,398 0 0	110 0 0	32 10 0
B. E. Nightingale, London	3,285 0 0	105 0 0	52 0 0
J. & M. Patrick, Chatham	3,180 0 0	105 0 0	12 14 0
Webb, Stratford	3,050 0 0	115 0 0	30 0 0
Carter, Grays	3,011 11 1	110 0 0	43 0 0
H. Fagg, London	2,957 0 0	100 0 0	43 0 0
C. Robson, Lewisham	2,850 0 0	110 0 0	25 10 0
T. W. Trappit, Beddington *	2,764 10 0	107 10 0	21 16 8

* Accepted subject to the approval of the Educational Department.

TIPTON.—For the construction of 15 in., 12 in., and 9 in. stoneware pipe sewers in Horseley Heath and Mill-street, for the Tipton Local Board of Health. Mr. W. H. Jukes, Surveyor, Owen-street, Tipton. Quantities supplied :—

	Mill-street Sewer.	Horseley Heath Sewer.
Walkden & Co., West Bromwich	£96 18 0	£963 0 0
Hughes & Son, Lower Gornal	97 0 0	825 0 0
Thos. Mayes, Great Bridge*	98 17 8	727 11 3
Surveyor's estimate	100 0 0	765 0 0

* Accepted.

WATFORD.—For alterations and additions to sanitary works at the London Orphan Asylum, Watford. Mr. Walter J. Ebbetts, surveyor, 115, Strand, W.C. :—

Geo. Jennings (accepted) £490 0 0

WEST HAM.—For the erection of the Boys' and Girls' Departments of the Silvertown Schools, to accommodate 600 children, for the West Ham School Board. Messrs. J. T. Newman & Jacques, 2, Fen-court, E.C., Architects to the Board. Quantities by Messrs. R. L. Curtis & Sons :—

Nightingale	£8,326	Goodchild	£7,943
Sharpe	8,130	Stimpson & Co.	7,930
Hosking	8,074	Reed	7,883
Catley	8,061	Morter	7,842
Norton & Son	8,032	Maddison*	7,719
Hearle & Farrow	8,020		

*Accepted subject to the approval of the Education Department.

WOOLWICH.—For rebuilding Nos. 90 to 98, Powis-street, Woolwich, for Messrs. Cuff & Co. Mr. H. H. Church, architect :—

Holloway Bros.	£5,500	Allen & Son	£5,225
B. E. Nightingale	5,497	H. L. Holloway	5,173
Multon & Wallis	5,390	J. Chapman	4,896
Kirk & Randall	5,350		

YARMOUTH.—For additions to No. 1, St. George's-road, Great Yarmouth, for Mr. W. A. Glanfield. Messrs. Bottle & Olley, architects, Great Yarmouth :—

G. U. Beech	£424 0	J. Leggett	£407 0
R. Eastoe	418 0	T. Howes, Gt. Yarmouth*	399 10

* Accepted.

Residential Flats, Oxford-street. — In reference to the list of tenders for this job, printed in our issue of the 18th inst., the Co-operative Builders, Limited, of Burton-road, Brixton, write to say that their tender, of 12,980*l.*, was omitted, for some reason. The omission was not ours.

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Walnut Dadoes ,, 1s. 11d. ,,
Oak, 1 inch Parquet Floors, laid and polished, from £7. 10s. a square.
Solid 1-inch Oak, straight boards, laid and polished, at £6. 18s. a square.
Solid ¾-inch Oak Parquet for covering Deal floors, laid and polished, from £5 a square.
Oak Wood Tapestry Dadoes, from 1s. per foot super.
Walnut or Mahogany, from 1s. 3d. per foot. super.
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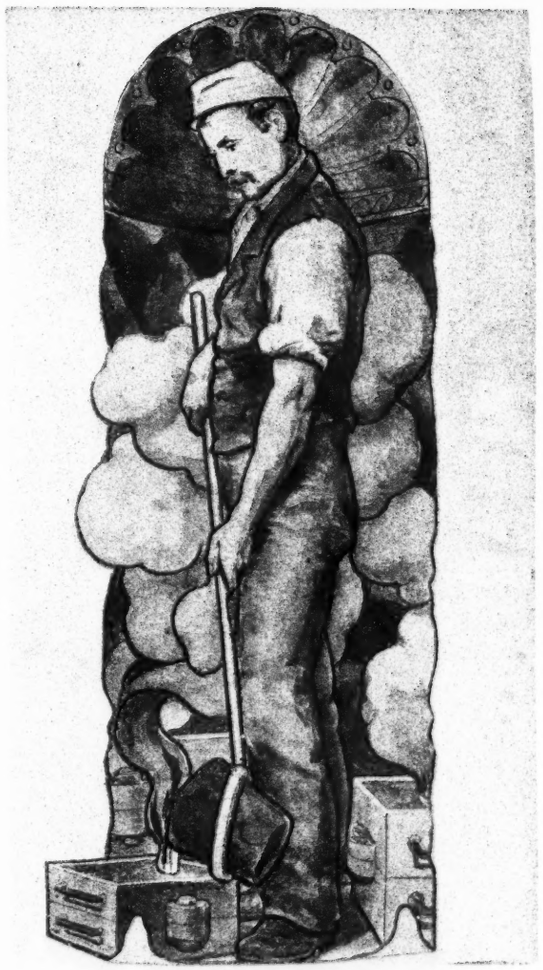


IRON FOUNDER.

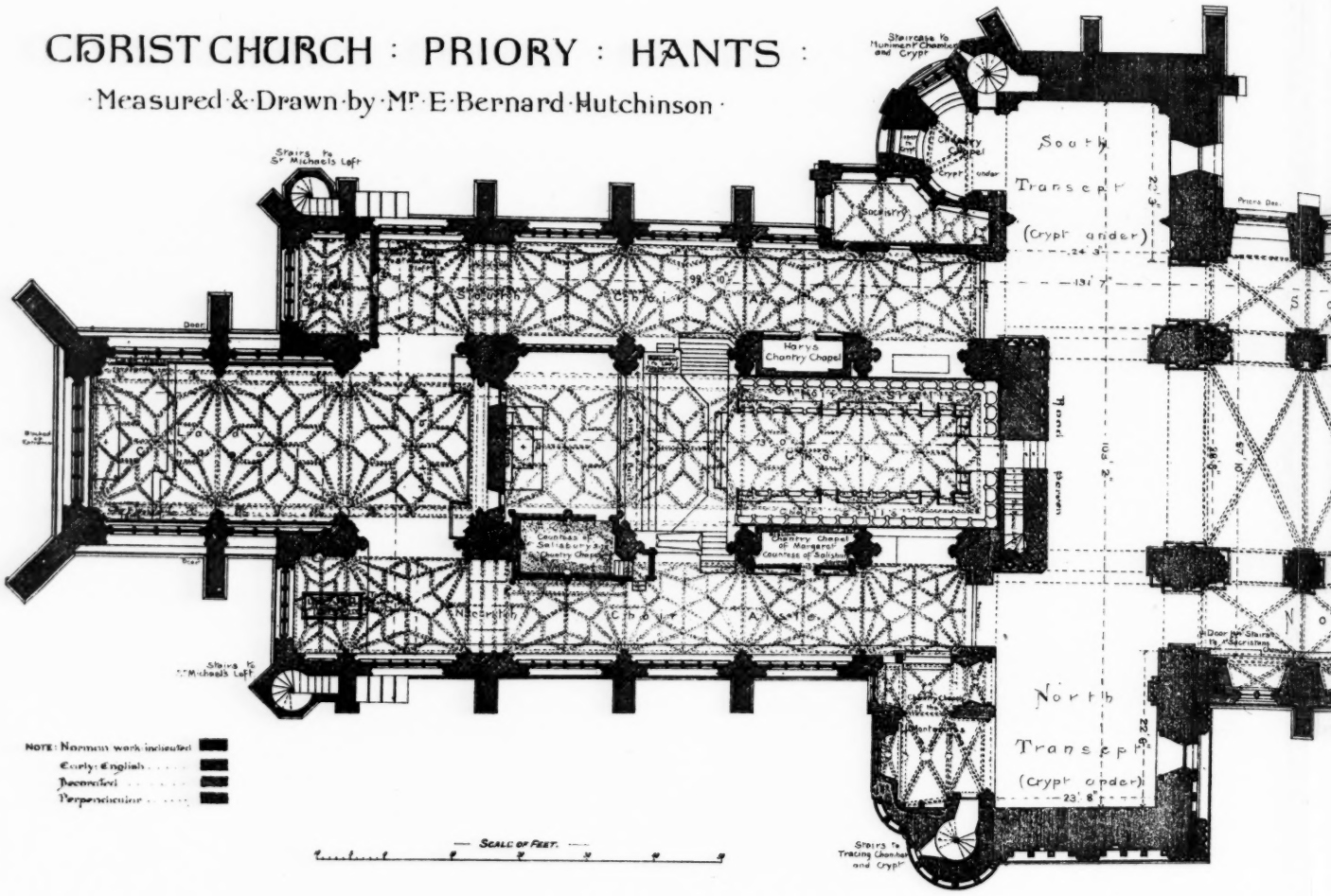
BIRMINGHAM WORKMEN.

INK-PHOTO SPRAGUE & Co 4 & 5 EAST HARDING STREET FETTER LANE, E.C.

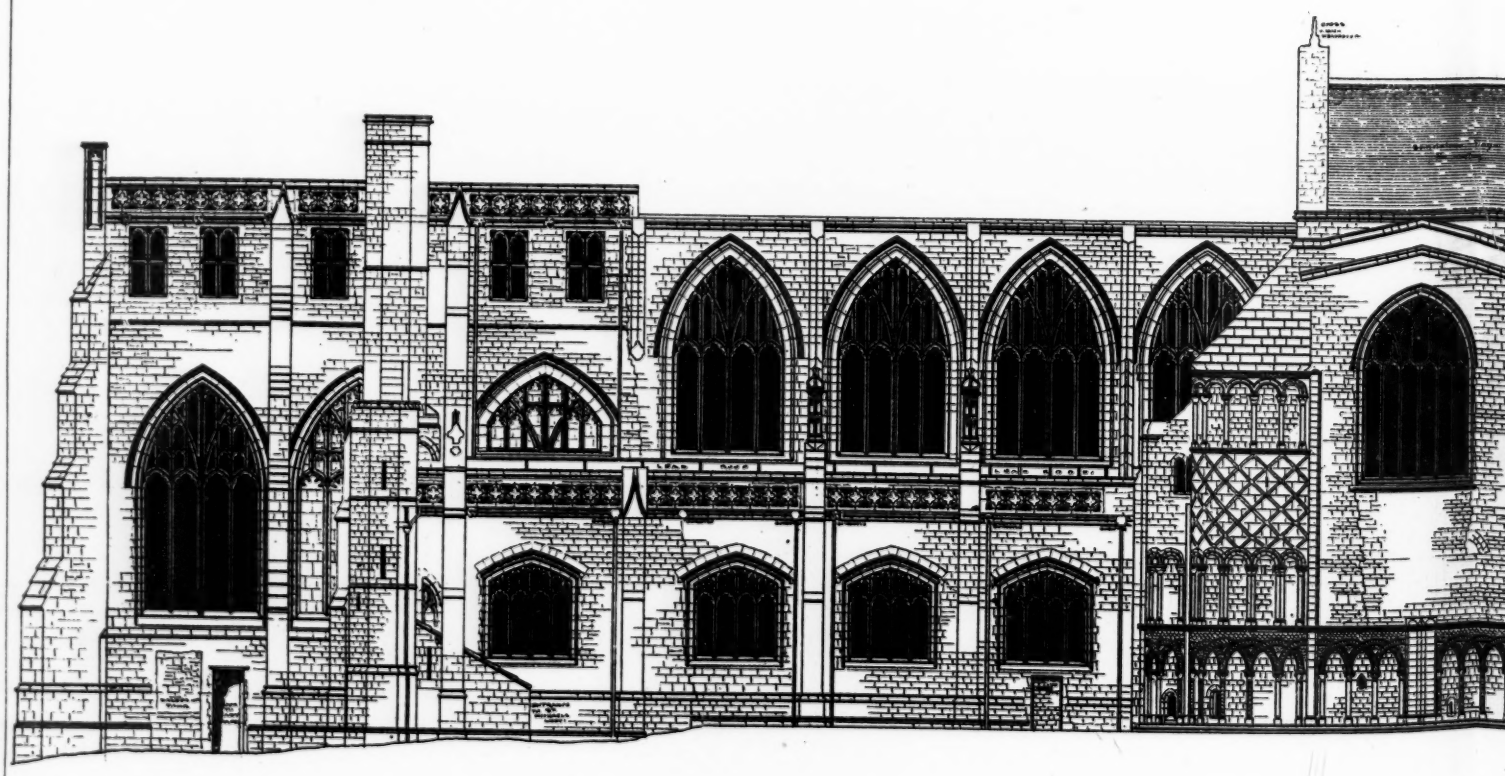
FIGURES IN WINDOW OF GREAT HALL, VICTORIA LAW COURTS, BIRMINGHAM.—Mr. Philip H. Newman, Inv. & Del.

CHRIST CHURCH : PRIORY : HANTS :

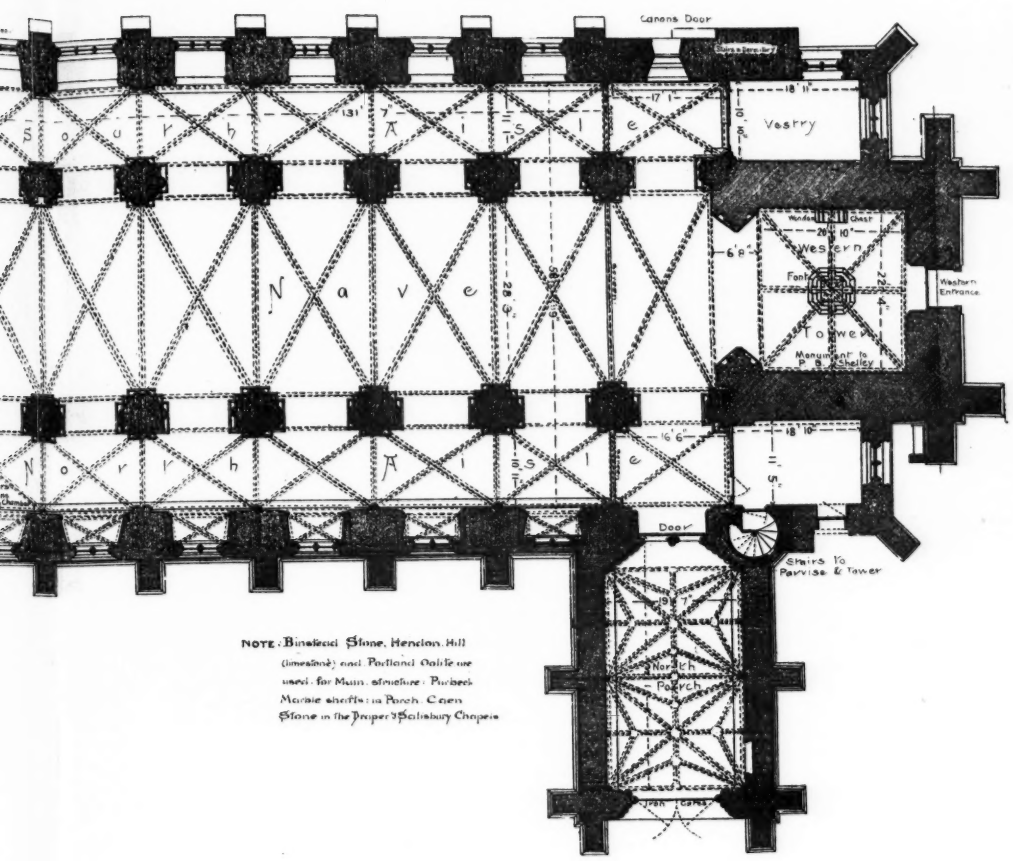
Measured & Drawn by Mr E. Bernard Hutchinson



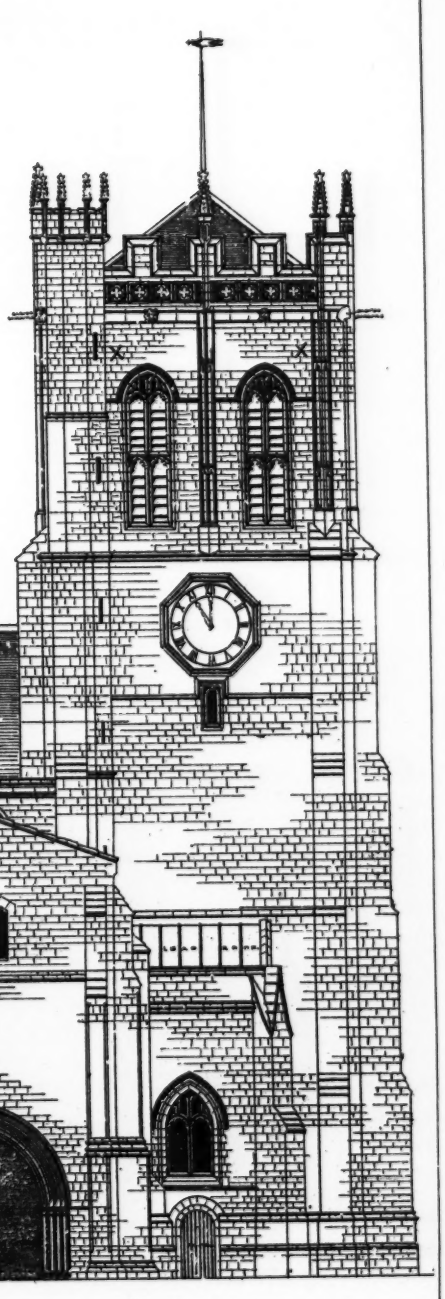
GROUND PLAN :



North



NOTE.-Binsfield Stone, Hendon Hill (limestone) and Portland Oolite are used for Main structure: Purbeck Marble shafts in Porch. Caen Stone in the Proper's Salisbury Chapels

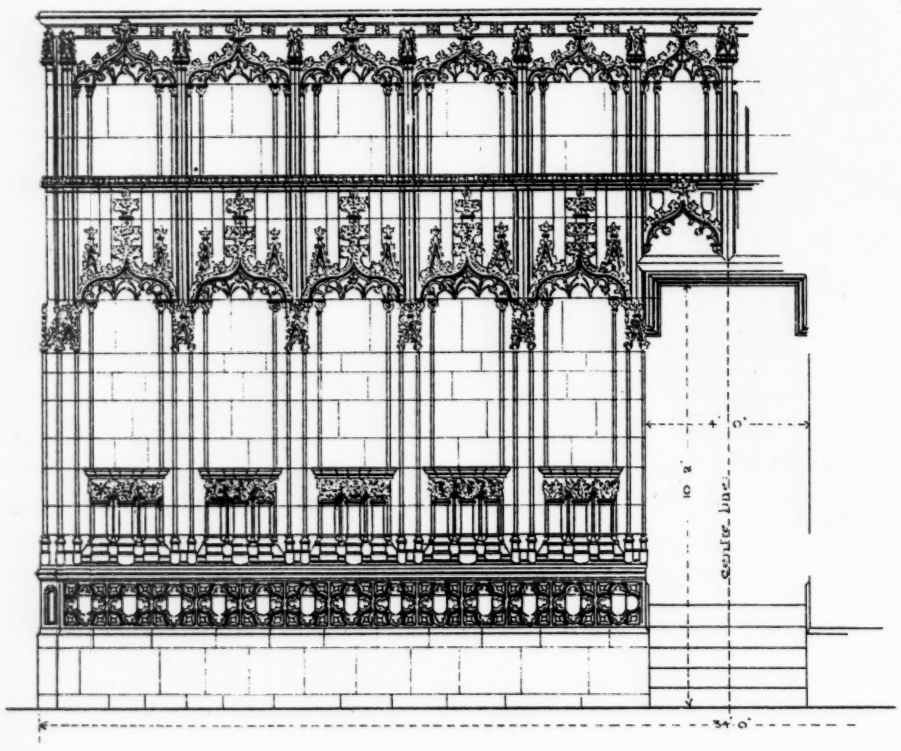


h Elevation:

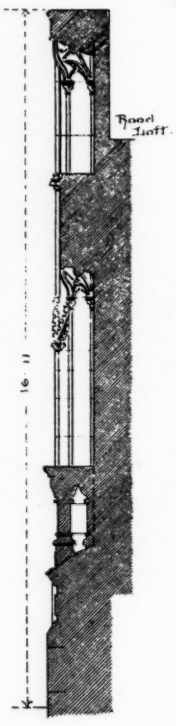
— SCALE OF FEET. —

PHOTO-LITHO. SPRAGUE & Co 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

Rood Screen: Details:



Half: Elevation



Section:

Half. Plan

CHRIST CHURC

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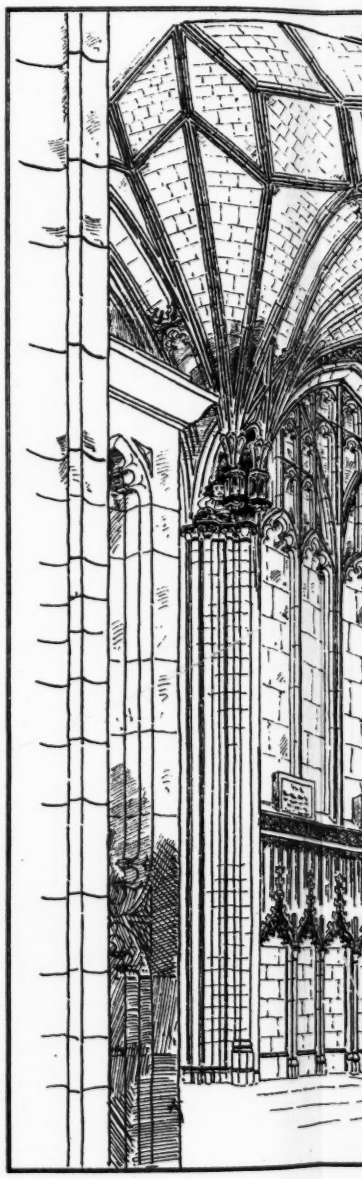
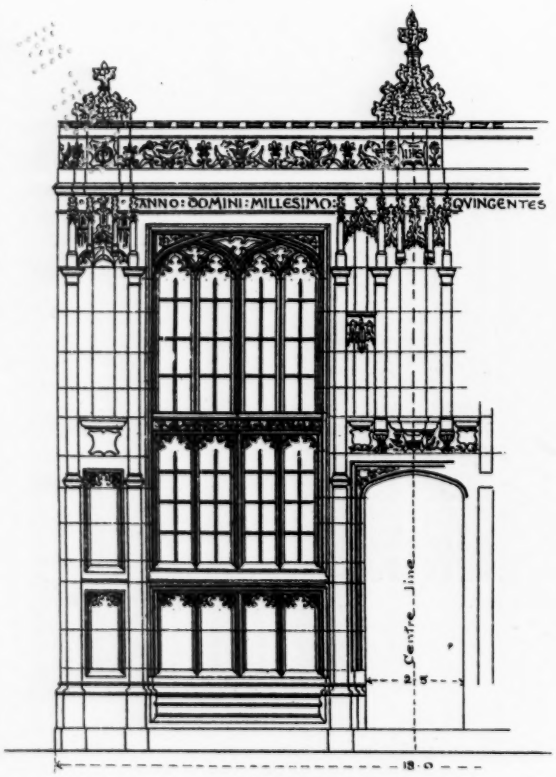
DETAILS: SHEWING: ROOD-

N: NAVE: AISLE AND N:



Sketch: shewing Lady: Chapel

Prior: Drapers: Chapel: (1529 AD)
Details:



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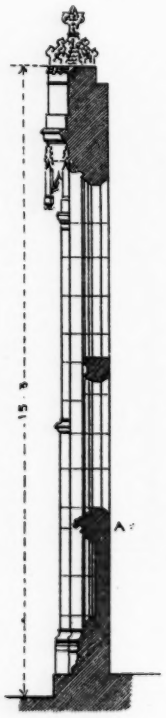

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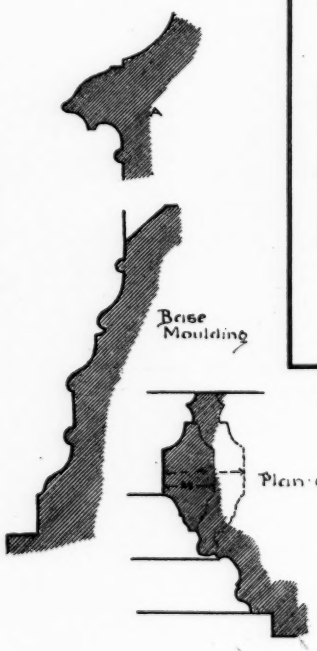
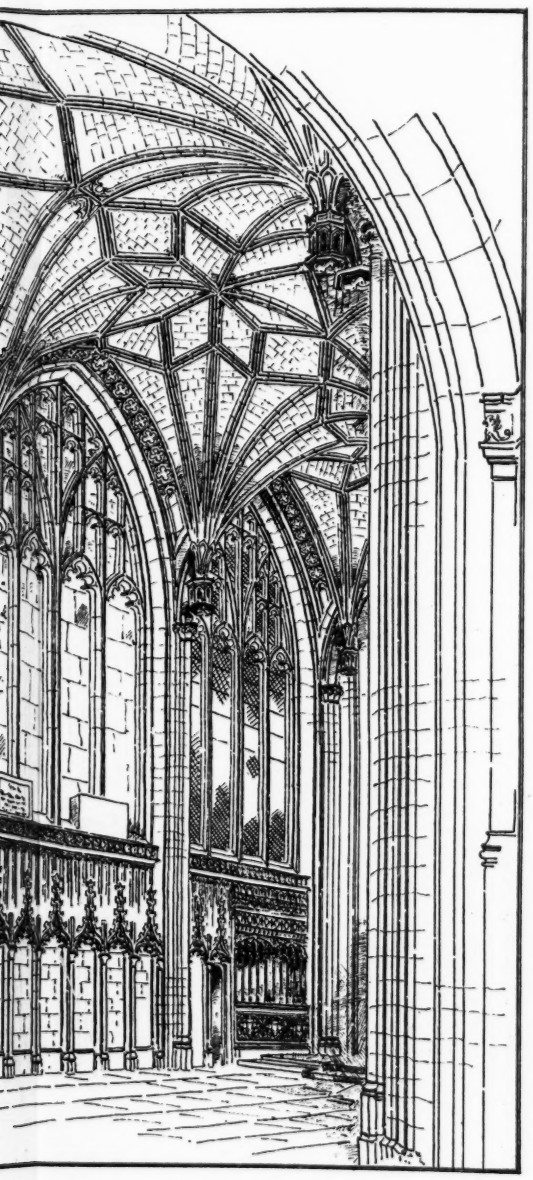


Measured & Drawn by

URCH : PRIORY :
HANTS

ROOD-SCREEN : PR DRAPERS : CHAPEL :
AND N: CHOIR : AISLE : WINDOWS :



: Chapel :

SCALE OF FEET.
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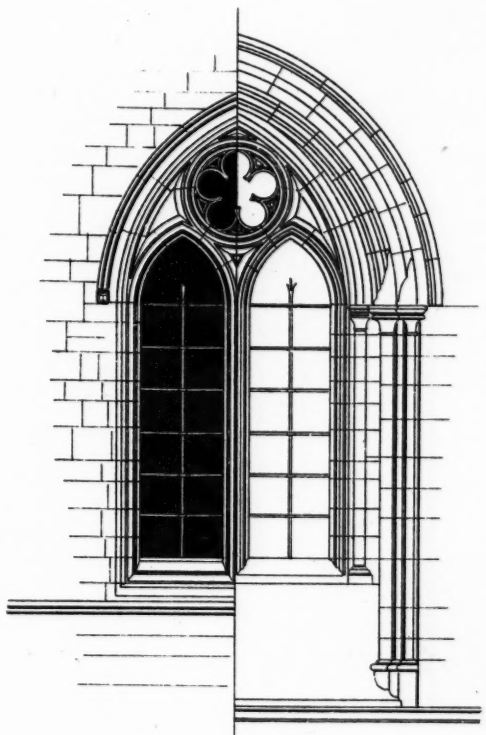
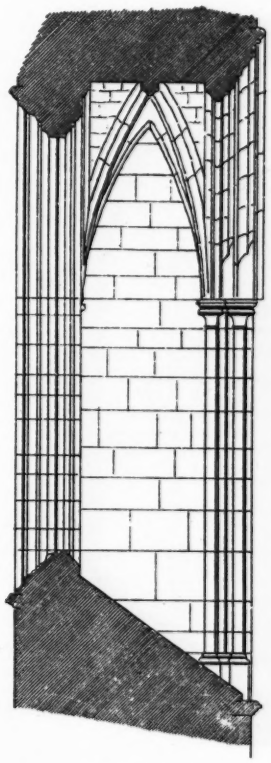
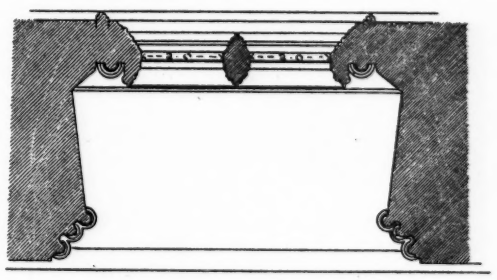
awn by Mr E. Bernard Hutchinson.



Half: Elevation Exterior | Half Elevation Interior



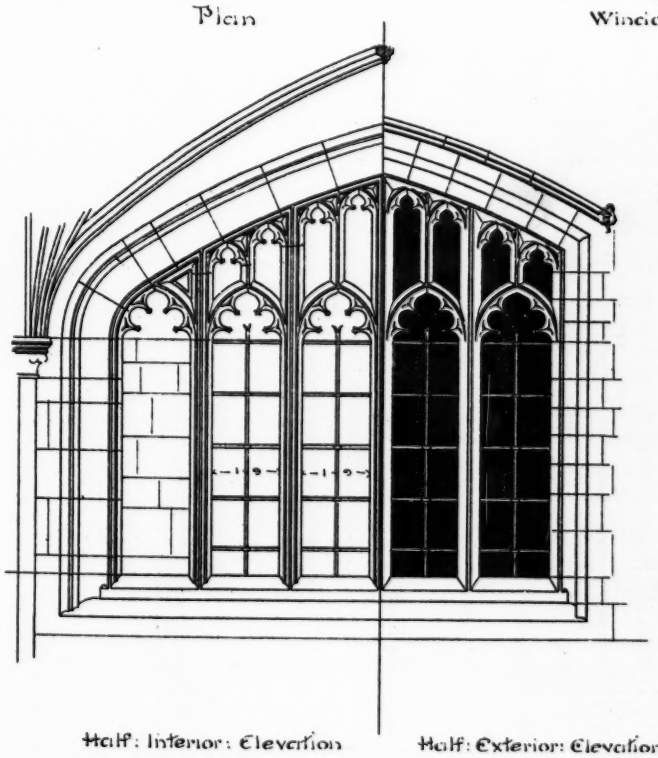
Section:



Plan

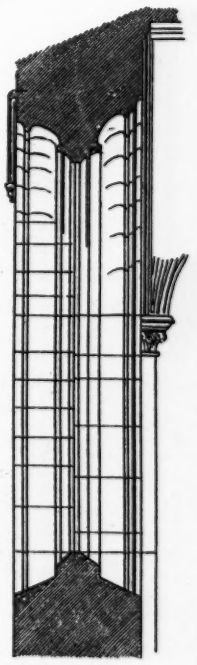
North: Nave: Aisle: Windows:

North: Choir: Aisle Windows



Half: Interior: Elevation

Half: Exterior: Elevation:

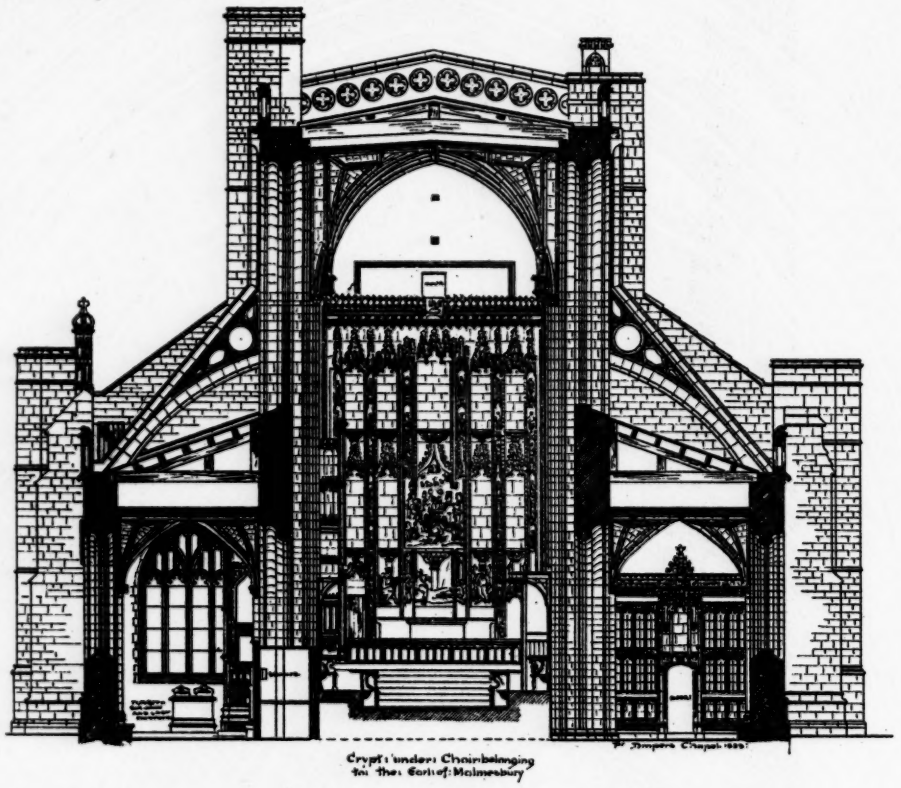


Section

PHOTO-LITHO. SPRAGUE & Co. 4 & 5 EAST HARDING STREET, FETTER LANE, E.C.

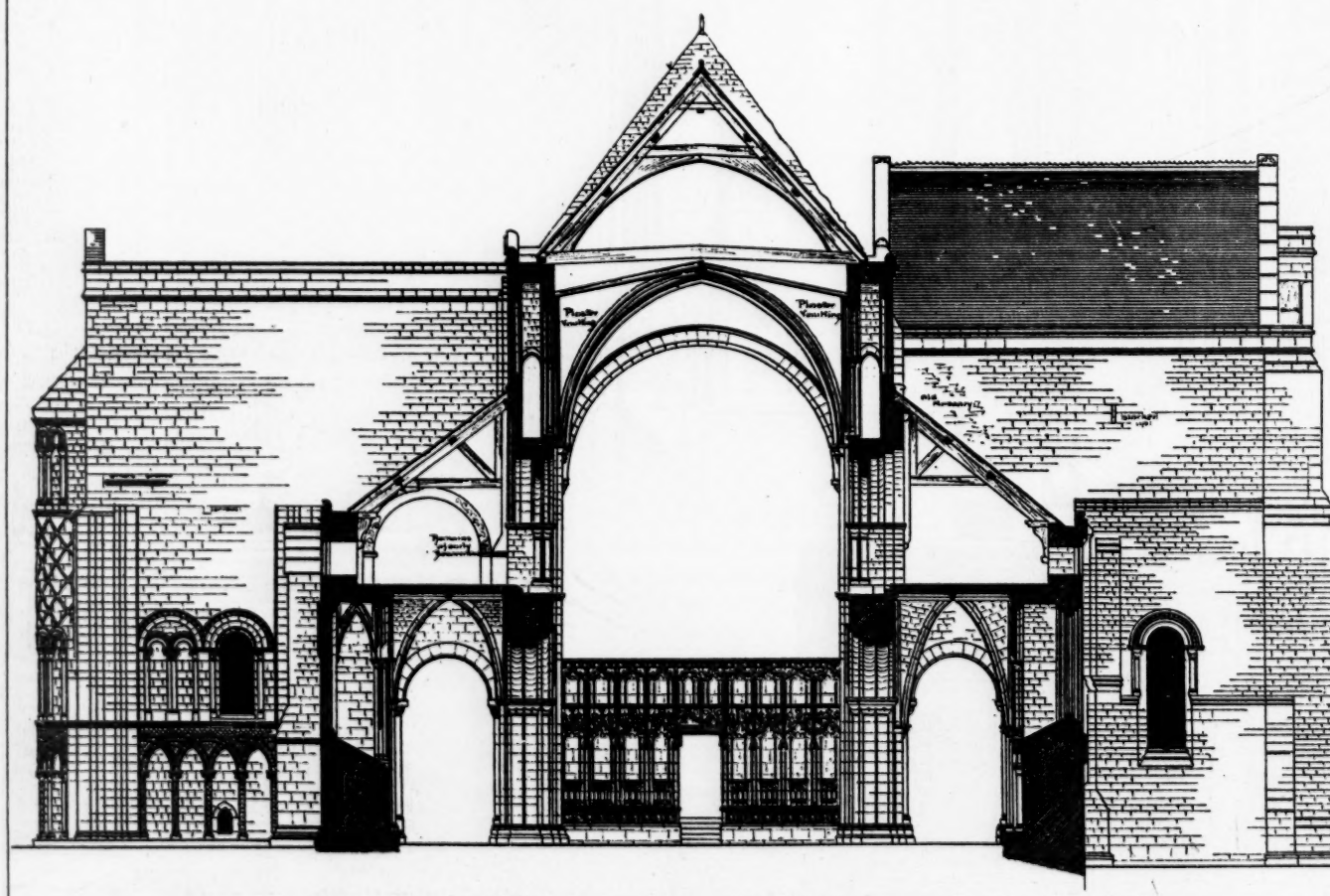
CHRIST CHURCH : PRIORY : HANTS :

Measured & Drawn by Mr E Bernard Hutchinson



CROSS : SECTION : THRO : CHOIR :

— SCALE OF FEET. —



CROSS : SECTION : THRO : NAVE :

PHOTO-LITHO. SPRAGUE & Co 4 & 5 EAST HARDING STREET, FETTER LANE, E.C.

St Peter's Church : Bushey Heath : New Chancel : James Neale F.S.A. Architect

PHOTO-LITHO. BY CHAS. S. ET. AL'S EAST HARDING STREET, FETTER LANE, E.C.